2001 Annual Report

East Hennepin Avenue Site

Prepared for
General Mills, Inc.

March 2002

BARR

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4700 West 77th Street
Minneapolis, MN 55435
Phone: (952) 832-2600
Fax: (952) 832-2601

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1.0 Introduction

This report summarizes the results from annual monitoring and remedial action operations conducted at the East Hennepin Avenue Site (Figure 1) during 2001. The activities completed in 2001 were generally consistent with those that have been conducted since 1985. The goals of the remedial action are to minimize the further migration of volatile organic compounds (VOCs), in particular, trichloroethylene (TCE), released from the former disposal area, and to improve the quality of the groundwater in the glacial drift and Platteville formation.

1.1 Site Operation and Brief Geological Overview

The current system consists of seven pump-out wells, a water treatment facility, and monitoring well networks in four aquifers. The pump-out wells are designed to control the movement of the plumes in the surficial glacial drift and in the underlying Carimona and Magnolia Members of the Platteville Formation. Four pump-out wells remove affected groundwater from the immediate vicinity of the site, which is treated by air stripping and discharged to the Minneapolis storm sewer system. Three pump-out wells remove less-affected groundwater downgradient of the site, which is discharged directly to the City storm sewer system and undergoes passive air stripping as the water flows to the Mississippi River. Annual and quarterly monitoring activities were completed in 2001 to monitor the effectiveness of the remediation systems.

Figure 2 shows a generalized geologic section of the site. There are about 50 feet of unconsolidated sediment underlying the site. As much as 10 feet of fill and peat are present near the surface. Underlying that is about 30 to 50 feet of sand alluvium, and 0 to 10 feet of clay till at the base. The uppermost bedrock is either the Decorah Shale (0 to 5 feet thick) or the Carimona member of the Platteville Limestone.

Groundwater generally flows southwest toward the Mississippi River. The water table occurs at about Elevation 830 to 840 feet MSL beneath the site, and the river is at about Elevation 725 feet MSL. Typically, there are downward gradients from the glacial drift aquifer to the Platteville Limestone, and from the Platteville Limestone to the underlying St. Peter Sandstone (the surface of the nearby Mississippi River occurs at about the middle of the St. Peter Sandstone). Because of this downward gradient, the groundwater in the Platteville Limestone beneath the site flows toward the northwest.

1.2 Site History

From about 1930 until about 1977, General Mills operated a technical center and research laboratories at 2010 East Hennepin Avenue in Minneapolis, Minnesota. Food research was conducted at this property until 1947, when General Mills commenced chemical research in addition to the food research. Beginning in about 1947, laboratory solvents from the chemical research operations were reportedly disposed of in a soil absorption pit located in the southeast portion property. The pit consisted of three 55-gallon drums that were perforated, stacked one on top of the another, and buried with the bottom of the deepest drum about 10 to 12 feet below the ground surface. The pit was used until approximately 1962.

On August 31, 1977, Henkel Corporation purchased the property at 2010 East Hennepin Avenue from General Mills. The drums and pipe that made up the disposal site were reportedly excavated in 1981, and the bottom of the excavation was reportedly about 12 feet deep. The action of removing and replacing the soil likely caused volatilization of much of the VOCs that were present prior to the excavation, and homogenization of those that remained afterward. In addition, some off-site soil was used in backfilling.

Site characterization work began in 1981. On October 23, 1984, a Response Order by Consent between the Minnesota Pollution Control Agency (MPCA) and General Mills, Inc., was executed by the MPCA Board, and this Response Order is the basis for subsequent and on-going remedial activities. The site is listed on the National Priorities List (USEPA ID Number MND051441731), but no Record of Decision was ever issued. In 1985, operation of the remediation systems began.

In September 1994 and 1999, the MPCA issued Five-Year Reviews of the site. The 1999 review generally affirming the 1984 Response Order, and led to a request for additional minor site investigation.

In 2001, General Mills completed an investigation of the shallow soils in the area of the former disposal site (August 30, 2001 letter from William Bangsund of Barr to Larry Deeney of General Mills and copied to Dagmar Romano and Mark Rys, MPCA). The results of the study led to a recommendation of no further action. The MPCA approved the letter report (September 28, 2001 letter from Mark Rys to Larry Deeney) with limited comments, including a request for reporting of additional monitoring parameters (benzene, ethylbenzene, toluene and xylene), which has been incorporated into this report. A later section in this report has a more detailed description of the 2001 investigation results.

1.3 2001 Operations

The pump-out and treatment systems operated within acceptable limits in 2001. Year 2001 monitoring results indicate that the pump-out systems are effectively preventing further lateral migration of VOCs in the glacial drift and Platteville. No complete risk pathways exist at the Site. Water quality data from the glacial drift, Platteville, St. Peter, and Prairie du Chien/Jordan are consistent with historic results.

The 2001 monitoring and remediation were carried out in response to the requirements of:

- Part II of Exhibit A to the October 23, 1984, Response Order by Consent between General Mills, Inc., and the MPCA;
- the January 1985 groundwater pump-out system plan, East Hennepin Avenue Site;
- Minnesota Department of Natural Resources (MDNR) water appropriation permits (85-6144 and 85-6145);
- NPDES Permit MN 0056022 (renewed on May 15, 2000);
- City of Minneapolis site registration;
- the 2000-2005 Operations and Monitoring Plan (Appendix A);
- agreements made between GMI and the MPCA.

1.4 Shallow Soil Investigation of 2001

General Mills completed an investigation of shallow soil, from the ground surface to a depth of 12 feet (just above the water table), near the former source area in 2001. Testing found low concentrations of solvents in the shallow soils, consistent with the history of waste disposal operations. Solvents were reportedly disposed in a disposal pit made of stacked, perforated 55-gallon drums buried in the ground, which likely caused the solvents to bypass the shallow soils.

The soil is relatively clean in the area of the former disposal pit. The central boring, GP1, was located near the center of the former disposal pit and eight additional borings were completed around GP1. The drums and pipe that made up the former disposal pit were reportedly excavated in 1981, and the bottom of the excavation was reportedly about 12 feet deep. The action of removing and replacing the soil likely caused

volatilization of much of the VOCs that were present prior to the excavation, and homogenization of those that remained afterward. In addition, some off-site soil was used in backfilling. Therefore, the finding of low concentrations of VOCs to a depth of 12 feet at boring GP1 is consistent with the history of waste disposal at this location.

Based on the comparison of the results to the MPCA's Soil Reference Values, the soil does not present a risk via direct exposure in the accessible zone. The uppermost four feet of soil would be acceptable in a residential setting, when, in fact, this is an industrial site. Clean up of soil deeper than four feet below the ground surface is not recommended, for reasons described below.

Some detected concentrations are above the MPCA's Soil Leaching Values. However, these results do not appear to be significant for the following reasons:

- It is likely that a larger mass of solvents is present below the water table in the vicinity of the former disposal pit. The calculated mass of solvents in the shallow soils in the area of the former disposal pit (assumed to be a cylinder of soil 13 feet thick and 60 feet in diameter) is on the order of 15 kg, or about four gallons. By comparison, pump-out wells 109 and 110 removed over 50 kg of solvent in 2000. A previous evaluation (March 6, 2001, memo from Joe Berns of Barr) estimated that total residual solvents in 1983 may have been as high as 800 gallons. The pump-out system has removed an estimated 480 gallons of solvent since it began operation. The estimated four gallons in the uppermost 12 feet of soil is less than 10 percent of the estimated remaining total mass of solvent in the soil and groundwater.

- Natural biological processes are likely degrading and destroying a portion of the solvents before they can be removed by the pump-out system.

- It is likely that at least some of the solvents present in the shallow soil column evaluated in this investigation are the result of volatilization from solvents dissolved in the groundwater. Thus, if existing soil was removed and clean backfill was placed, the clean backfill would likely become contaminated by continued volatilization from solvents in the groundwater beneath the site.

Based on the results of this investigation, clean up of the soil above the water table would not increase the effectiveness or the protectiveness of the existing remedial action.

2.0 Quality Assurance

This section presents a review of the field sampling procedures and laboratory performance throughout 2001 as measured by the quality control samples. The monitoring program is described in Appendix A. Appendix B contains the field sampling report and laboratory report from the December monitoring event (previous data were presented in quarterly NPDES reports). The results of the analyses of the QC samples are in tables in Appendix C. The analytical data were evaluated according to the procedures outlined in the Barr Engineering Company Standard Operating Procedures for Routine Level Organic Data Validation (Barr 1999) derived from the U.S. EPA Functional Guidelines for Organic Data Review (1999).

Staff from Barr Engineering Company collected the field data and the samples submitted for laboratory analysis. Tri-Matrix Laboratories in Grand Rapids, Michigan, analyzed the samples using U.S. EPA approved methodologies.

The quality control review included reviewing the holding times, methods, trip samples and field blank samples, surrogate spike sample recoveries, matrix and matrix spike duplicate sample data (when applicable), laboratory control samples, and masked (or blind) duplicate sample data. Matrix spike (MS) and matrix spike duplicate (MSD) samples or laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) data and masked duplicate sample data are used to measure laboratory based precision and accuracy. The accuracy was determined by the percent recovery of the spiked compounds, and the precision was determined by calculating the Relative Percent Difference (RPD) for the duplicate data pairs where both samples had detectable concentrations.

Field, trip and laboratory blank samples were collected and analyzed to monitor potential interference from incomplete decontamination of field equipment, sample transport contamination, and laboratory procedures. Following EPA guidance, positive concentrations in samples less than 5 times (or 10 times for common laboratory contaminants) the blank sample concentrations are qualified as potentially false positive values, and noted in the data tables.

The lab completed all analyses within holding times. No detectable concentrations of target compounds were reported in the field, trip and laboratory blanks associated with the 2001 monitoring. Table C-1 presents a summary of the blank sample results for 2001. The September data reported slightly elevated surrogate spike recoveries for the aromatic compounds. Since all other quality control requirements were met, no qualification was necessary. The data from December included a high MS recovery for 1,1-

dichloroethene. Since this is not a target compound, further action was not required. The data from February, May, and September included high LCS recoveries for 1,2-dichloroethane (1,2-DCA). High LCS recoveries could be linked with false positive results. Since all of the associated samples were non-detect for 1,2-DCA, no further action was needed. Masked duplicate samples were collected from sampling locations well MG-2, MG-EFF, well 111, and well 8 (Table C-2). The precision was determined by calculating the RPD for the data pairs. The RPD results are dependent on the homogeneity of the sample. High RPDs are expected when results are at or near the reporting limit and do not always indicate poor precision. All RPD results met acceptance criteria.

All quality control aspects of the groundwater monitoring program at the site demonstrated compliance with the data quality objectives as measured by the quality control samples. All analytical data were validated and determined useable as presented in the data tables.

3.0 Groundwater Monitoring

Figure 3 shows the site monitoring points. Figure 4 is a map of the site.

3.1 Water Level Monitoring

The 2001 monitoring program included measuring water levels from six wells screened in the glacial drift; nine wells screened in the Carimona Member of the Platteville Formation; five wells open to the Magnolia Member of the Platteville Formation; and four wells screened in the St. Peter Sandstone. Well construction details are shown in Appendix D. Water level monitoring was carried out in accordance with the 2000–2005 Operations and Monitoring Plan (Appendix A). Historic groundwater elevations are in Appendix D. The 2001 water level measurements are described in Sections 2.1.1 through 2.1.4.

3.1.1 Glacial Drift

Groundwater elevations were measured in glacial drift monitoring wells Q, S, T, V, W and X on December 4, 2001 (Table 1). The estimated water table contours in the glacial drift are shown on Figure 5. As in past years, the 2001 water levels indicate groundwater in the glacial drift flows toward the southwest.

3.1.2 Carimona Member of Platteville Formation

Groundwater elevations were measured in nine Carimona Member monitoring wells 8, 9, 10, 11, 12, RR, SS, UU and WW on December 4, 2001 (Table 2). The estimated Carimona potentiometric surface is shown on Figure 6. As in past years, the 2001 water levels indicate groundwater in the Carimona member flows toward the north-northwest.

3.1.3 Magnolia Member of Platteville Formation

Water levels were measured in Magnolia Member monitoring wells OO, QQ, TT, VV and 14 on December 4, 2001 (Table 3). The estimated potentiometric surface is shown on Figure 7. As in past years, the 2001 water levels indicate groundwater in the Magnolia member flows toward the northwest. A recovery test was performed in December 2001 to verify capture areas for Magnolia pump-out wells MG1 and MG2, as discussed later in this report.

3.1.4 St. Peter Sandstone

Water levels were measured in St. Peter Sandstone monitoring wells 200, 201, 202 and 203 on December 4, 2001 (Table 4). Figure 8 shows the locations of the St. Peter Sandstone monitoring wells and the estimated potentiometric surface. As in past years, the water levels indicate groundwater in the St. Peter Sandstone flows toward the southwest.

3.2 Water Quality Monitoring

The 2001 annual monitoring program included the collection of water quality samples from monitoring wells screened in the glacial drift, wells open to the Carimona or Magnolia Members of the Platteville Formation, wells screened in the St. Peter Sandstone, and one well open to the Prairie du Chien/Jordan (former Henkel well). All monitoring activities were performed in accordance with the 2000-2005 Operations and Monitoring Plan (Appendix A). The 2000-2005 Operations and Monitoring Plan required that groundwater samples collected from the glacial drift, Platteville Formation, St. Peter Sandstone, and Prairie du Chien/Jordan wells during even years be analyzed for trichloroethylene (TCE) and during odd years be analyzed for the a longer list (Appendix A). The groundwater samples collected during December of 2001 were analyzed for the longer list in accordance with the Plan.

The results of the 2001 analyses of monitoring well samples are in Tables 6 through 10. Results from the pumping wells are in Tables 11 through 13. The corresponding applicable Consent Order and NPDES permit limits are also shown in the tables. Historic TCE concentrations and corresponding Consent Order and NPDES permit limits for the glacial drift, Carimona Member, Magnolia Member, St. Peter Sandstone, Prairie du Chien/Jordan, and the groundwater pump-out and treatment system are summarized in Appendix D. The laboratory reports and chain-of-custody forms are in Appendix B. The results from the 2001 monitoring program are discussed in Section 5.0.

3.2.1 Monitoring Wells in the Glacial Drift

Groundwater samples were collected from five glacial drift monitoring wells (Q, T, V, W and X) on December 5 and 6, 2001. The samples were analyzed for List 2 VOCs. The results from the laboratory analyses are in Table 6 and the TCE concentrations are shown on Figure 9. The 1985 through 2001 historic TCE concentrations in samples from glacial drift wells Q, X and V are shown on Figure 10.

3.2.2 Monitoring Wells in the Carimona Member of Platteville Formation

Groundwater samples were collected from seven monitoring wells (8, 9, 10, 11, 12, SS and UU) screened in the Carimona Member of the Platteville Formation. The samples were collected over the period of December 4-10, 2001. The samples were analyzed for List 2 VOCs. The results from the laboratory analyses are in Table 7 and the TCE concentrations are shown on Figure 11. The 1985 through 2001 TCE concentrations for samples from Carimona Member wells 10 and 11 are shown on Figure 12.

3.2.3 Monitoring Wells in the Magnolia Member of Platteville Formation

Groundwater samples were collected from three monitoring wells (14, QQ and TT) open to the Magnolia Member on December 5 and 6, 2001. The samples were analyzed for List 2 VOCs. The results from the laboratory analyses are in Table 8 and the TCE concentrations are shown on Figure 13. The 1985 through 2001 TCE concentrations for Magnolia Member wells QQ and TT are shown on Figure 14.

3.2.4 Monitoring Wells in the St. Peter Sandstone

Groundwater samples were collected from St. Peter Sandstone monitoring wells 200, 202 and 203 on December 10, 2001. The samples were analyzed for List 2 VOCs. The results from the laboratory analyses are in Table 9 and the TCE concentrations are shown on Figure 15. Historic TCE concentrations for St. Peter Sandstone well 200 are shown on Figure 16.

3.2.5 Prairie du Chien/Jordan Monitoring Well

A groundwater sample was collected from the former Henkel well, open to the Prairie du Chien/Jordan, on December 7, 2001. The sample was analyzed for List 2 VOCs. The results from the laboratory analysis are in Table 10.

3.2.6 Off Site Groundwater Pump-out System

Composite samples were collected in May of 2001 from the downgradient glacial drift pump-out wells 111, 112 and 113. This composite was made up of equal volumes of groundwater grab samples from wells 111, 112 and 113. At the request of the MPCA, well-specific samples were also collected from the wells during the other three quarters in 2001 (although well 112 was not operating in August during the quarterly sampling). For the three events when individual samples were collected, the equivalent downstream discharge concentration was calculated using the results from the individual well samples using a flow-weighted average method based on the pumping rates of the individual wells. The samples

were analyzed for the VOCs required by the NPDES permit (Appendix A). The results from the laboratory analyses are in Table 11. The 1985 through 2001 TCE concentrations for the downgradient groundwater pump-out system discharge are shown on Figure 17.

3.2.7 On Site Glacial Aquifer Pump-out and Treatment Systems

Groundwater treatment system influent and effluent samples were collected quarterly (February, May, August, and November 2001). Samples were collected using a combination of composite and grab samples, similar to the sampling of the downgradient pump-out well system described above. A composite influent sample was made up of equal volume grab samples from wells 109 and 110 during the May event. At the request of the MPCA, grab samples from wells 109 and 110 were analyzed during the other three quarterly events. The combined influent concentration was calculated using a flow-weighted average. Air stripper effluent samples were collected after groundwater pumped from wells 109 and 110 had been treated in the air stripper. The results from the laboratory analyses are in Table 12. The 1985 through 2001 TCE concentrations for the air stripper influent and effluent samples are shown on Figure 17.

3.2.8 On Site Magnolia Aquifer Pump-out System

Samples were collected from the Magnolia groundwater pump-out system wells MG1 and MG2 quarterly (February, May, August, and November 2001). Effluent from these wells is discharged to the base of the air stripper and then to the storm sewer. Similar to the other pump-out systems, a composite sample was analyzed during the May event, and individual well grab samples were analyzed during the other three quarters. The results from the laboratory analysis are in Table 13. The 1993 through 2001 TCE concentrations for the MG pump-out well effluent are shown on Figure 18.

4.0 Remedial Action Operations

Although the new NPDES permit no longer requires monthly reporting of discharge, General Mills believed it was prudent to continue monthly site visits and system checks to ensure continuing system performance.

4.1 Groundwater Pump-out Systems

The East Hennepin Avenue Site groundwater pump-out system is made up of seven wells:

- On-site glacial drift pump-out wells 109 and 110 (Figure 5).
- On-site Platteville pump-out wells MG1 and MG2 (Figure 7), and
- Downgradient glacial drift pump-out wells 111, 112 and 113 (Figure 5).

The performance of each pump-out system is discussed in Sections 4.1.1 through 4.1.4. The combined groundwater pump-out systems removed and discharged 296 million gallons of groundwater in 2001 (563 gpm). The average monthly pumping rate (gpm) for each of the pump-out wells is shown in Table 14. The operational downtime and operating time percentage for 2001 for each system are shown in Table 14. Figure 19 is a series of graphs illustrating pumping performance in 2001.

4.1.1 On-Site Glacial Drift System

The on-site glacial drift pump-out well system (wells 109 and 110) is designed to contain groundwater in the glacial drift with the highest TCE concentrations as set forth in the October 25, 1984 Consent Order. The average combined pumping rate for the on-site glacial drift pump-out system during 2001 was 95 gallons per minute. Average monthly pumping rates for each well ranged from 11 to 73 gpm. A total of approximately 49.8 million gallons was removed from the glacial drift by the on-site glacial drift pump-out well system in 2001.

4.1.2 Downgradient Glacial Drift System

The downgradient glacial drift pump-out well system is designed to contain groundwater in the glacial drift downgradient of the site with a concentration of TCE exceeding 270 µg/L as specified in the Consent Order. The downgradient glacial drift pump-out wells 111, 112 and 113 operated at an average combined rate of 274 gallons per minute in 2001. The pumping rates are monitored monthly, and individual monthly

pumping rates ranged from 0 to 112 gallons per minute (Table 14). Approximately 143 million gallons of groundwater was removed from the glacial drift by the downgradient pump-out system during 2001.

4.1.3 Carimona System

Carimona pump-out well 108 has not been operated since 1993 when Magnolia pump-out wells MG1 and MG2 began operation.

4.1.4 Magnolia System

The Magnolia pump-out well system (wells MG1 and MG2) is designed to contain groundwater with a TCE concentration exceeding 27 µg/L in both the Magnolia and Carimona Members of the Platteville Formation. Wells MG1 and MG2 operated at an average combined rate of 195 gallons per minute in 2001. The pumping rates are monitored monthly, and individual monthly pumping rates ranged from 82 to 118 gallons per minute. A total groundwater volume of approximately 102.4 million gallons was removed from the Platteville Formation during 2001 (Table 14).

A 24-hour aquifer recovery test was performed on December 21 and 22, 2001, to verify capture areas for the Magnolia Member pump-out system. The pump-out wells were shut down for 24 hours. Water levels were measured in Carimona Member wells RR, SS and WW and Magnolia Member wells OO, TT and VV prior to shut down and 24 hours after shut down. Water level recoveries for these wells ranged from 2.18 to 8.59 feet (Table 15). The recovery test is discussed in detail in Section 5.7.

4.2 Maintenance and Downtime

All pump-out wells were operated continuously at the maximum sustainable yield of the pumps or aquifer during 2001, except for shutdowns caused by electrical or mechanical failures, or the need for well or system maintenance. Table 14 presents reasons for downtime during 2001.

Appendix A lists target and action level pumping rates for each of the groundwater pump-out wells. When pumping rates for an individual well dropped below the monthly action level (Table 14), action was taken to return the pumping rate above the action level. Monthly pumping rates for the pump-out wells at wells 113 and MG-2 were above action levels indicating that the pump-out wells were operating effectively. However, the monthly pumping rates for the other pump-out wells were occasionally below their respective pumping rate action level.

4.3 Groundwater Treatment System

The glacial aquifer groundwater extracted on site contains the highest VOC concentrations, and is treated actively with an on-site air stripping tower. The remaining extracted groundwater contains much lower concentrations of VOCs, and this groundwater is passively treated by discharge to the storm sewer system. Influent and effluent data are summarized in Table 12. The NPDES Permit discharge limits include an annual average effluent TCE concentration of 50 µg/L with a daily maximum limit of 100 µg/L. The 2001 results from the treatment system effluent were below detection limits in all samples, in compliance with the NPDES Permit discharge limits.

The air stripper tower is designed to remove greater than 99 percent of volatile organic compounds from influent groundwater at a discharge rate of up to 150 gallons per minute and a total VOC concentration equal to 1985 conditions, or about 1,000 µg/L. Currently, the pumping rate to the tower is 80 gpm, and the influent VOC concentration is about 250 µg/L, so the system is operating well below design assumptions. No VOCs were detected in samples collected from the stripping tower effluent in 2001, confirming that the treatment system was effective in 2001.

Scale formation within the air stripping tower has been identified as a cause of decreased treatment efficiency. In 2000, General Mills installed a pre-treatment system in an effort to reduce hardness buildup. The effectiveness of this system continues to be evaluated. The system was upgraded once in 2001 with a multi-frequency model. A second upgrade to a more powerful unit was completed in February 2002. The effectiveness of this technology is not completely proven.

5.0 Discussion of Water Quality Results

The 2001 monitoring results are consistent with past monitoring results. Graphical representations of historic TCE concentrations in samples from selected glacial drift, Carimona Member, Magnolia Member, and St. Peter Sandstone monitoring wells, the down gradient pump-out system, groundwater treatment system, and Magnolia pump-out system are shown on Figures 10, 12, 14, 16, 17 and 18, respectively. Historic TCE water quality data from the various sampling locations are in Appendix D.

Glacial drift and Platteville monitoring is focused on indicator wells selected to monitor pump-out system effectiveness. Several wells within the containment zone of the glacial drift and Platteville pump-out well systems are consequently not monitored. Historic TCE water quality results for samples from the indicator wells are in Appendix D.

5.1 Glacial Aquifer

The groundwater elevations indicate that the direction of groundwater flow in the glacial drift is to the southwest. The 2001 groundwater elevations are within the range of historic water elevations. Water level measurements collected during 1985 and 1986 following startup of the groundwater pump-out well systems demonstrated the effectiveness of the on-site and downgradient glacial drift pump-out systems in preventing lateral migration of glacial drift groundwater with TCE concentrations exceeding 270 µg/L. Glacial drift groundwater elevations from 2001 indicate that the lateral containment zone established during 1985 and 1986 continues to be maintained.

5.1.1 Site Groundwater Pump-out Systems

The results from the analyses of samples collected in 2001 from the on-site glacial drift pump-out well system indicate that the average TCE influent concentration was about 199 µg/L and that the average total VOC concentration was about 241 µg/L (Table 12). The laboratory results indicate that TCE remains the predominant volatile organic compound in the groundwater in the immediate vicinity of the Site. Historic trends are as follows (Figure 17):

- Glacial aquifer TCE concentrations in the on-site pump-out wells were:
  - Initially, about 1,000 µg/L;
  - Stabilized at about 400 µg/L from about 1988 to 1999;

- Decreased to about 300 µg/L from 1999 through 2000;
- Further decreased to about 250 µg/L in 2001.

- Glacial aquifer TCE concentrations in the downgradient pump-out wells were:
  - Initially, about 300 µg/L;
  - Steadily declined to about 100 µg/L in about 1994;
  - Steady at about 50 to 100 µg/L since 1994.
- TCE concentrations in the on-site Magnolia wells were:
  - Initially, about 25 µg/L;
  - Declined to about 18 µg/L by 1996, and have held fairly steady thereafter.

Analyses of samples collected from wells 109 and 110 are in Table 12. The samples from well 110 contain about 280 µg/L TCE; samples from well 109 contain about 150 µg/L TCE. These results are consistent with pump-out well specific monitoring that has been conducted over the past four years. Well 110 is pumped at a higher rate than is well 109.

5.1.2 Downgradient Pump-out System

The average TCE concentration in 2001 samples was 62 µg/L, and the average total VOC concentration was 74 µg/L (Table 11), similar to results from the past 10 years (Figure 17). The NPDES permit establishes a pH limit and a requirement that no foam or oil sheen be present. The pH was consistently between 6.0 and 9.0 and there was no foam or oil sheen visible on any of the samples.

Analyses of samples collected from the individual pump out wells are in Table 11. The concentration of TCE detected in the sample from well 111 is one to two orders of magnitude lower than detected in samples from wells 112 and 113 (Table 11). Samples from well 113 consistently contain the highest TCE concentrations. These results are consistent with pump-out well specific monitoring that has been conducted over the past 3 years. These wells are pumped at similar rates.

5.1.3 Glacial Aquifer Monitoring Wells

The 2001 monitoring results from the downgradient sentry wells (Table 6) indicate that the downgradient pump-out system is effective in laterally containing glacial drift groundwater with a TCE concentration exceeding 270 µg/L. The results from 2001 are consistent with historical results. The TCE concentrations generally decreased after the startup of the glacial drift pump-out well systems in 1985 through about 1991, and thereafter have generally stabilized.

5.1.4 BTEX in the Glacial Aquifer

At the request of the MPCA, BETX (benzene, ethylbenzene, toluene and xylene) are being reported. None of these compounds were detected in the 2001 monitoring well samples collected from the glacial aquifer. Nor were these compounds detected in the samples from pumping wells 111, 112, or 113. The following were detected in the samples from pumping wells 109 and 110:

- Benzene was detected in one (2.8 µg/L) of five samples from the wells, and was not detected in the one influent sample.
- Ethyl benzene was not detected.
- Toluene was detected in two (2.8 and 25 µg/L) of five samples from the wells, and at 21 µg/L in the single influent sample.
- Xylenes were detected in one (18 µg/L) of five samples from the wells, and were not detected in the one influent sample.

These concentrations are all below the respective MPCA Health Risk Limits. Being related to gasoline, these compounds are some of the most commonly detected VOCs in an urban area such as this. The detected concentrations suggest that this site is not a significant source for these compounds.

5.2 Carimona Member of Platteville Formation

Water levels in the Carimona monitoring wells were generally comparable to those measured in recent years. The potentiometric levels (Figure 6) indicate that the direction of groundwater flow in the immediate vicinity of the site continues to be towards the northwest.

Historic TCE concentrations (1986-2001) reported for wells 10 and 11 are shown on Figure 12. Historic results for all wells are in Table D-7 (Appendix D).

Samples from wells SS, 9, and 12 during 2001 have typically had the lowest TCE concentrations of the Carimona monitoring wells, between non-detectable and 10 µg/L. The 2001 results are similar to historic results.

When sampling began in the mid-1980s, samples from the other Carimona wells typically had TCE concentrations ranging from 100s to 1,000s of µg/L. The TCE concentrations in samples from these wells have generally declined since the startup of the Platteville groundwater recovery system in 1985, and stabilized in about 1995 at concentrations less than 100 µg/L. The 2001 concentrations in the samples from these wells are consistent with historic results. Based on the water level data, groundwater from wells UU, 8, and 10 is likely flowing toward either: well SS, where the TCE concentration is about 2 µg/L; or downward into the Magnolia member where groundwater is being captured (see next section).

Toluene, ethylbenzene and xylene were not detected in any of the Carimona member well samples. Benzene was detected in the samples from wells 8, 9, and 11.

5.3 Magnolia Member of Platteville Formation

The potentiometric groundwater surface elevations measured in November 2001 are similar to water elevations measured since the Magnolia pump-out system began operation in 1993. The potentiometric levels (Figure 7) indicate the direction of groundwater flow in the immediate vicinity of the Site continues to be northwest.

5.3.1 Magnolia Member Pumping Wells

The 2001 results indicate an average TCE concentration of 15.9 µg/L and an average total VOC concentration of 17.7 µg/L in the groundwater extracted from the Magnolia member (Table 13). There has been a general downward trend of TCE in the Magnolia well effluent since system startup in 1993 (Figure 21). The TCE concentration in the initial Magnolia effluent samples was about 30 µg/L. The concentration of TCE measured in samples from well MG1 was approximately two times that in samples from well MG2, which is also consistent with historic data.

The NPDES permit establishes discharge limits for the Magnolia pump-out system for TCE and pH, and a requirement that no foam or an oil sheen be present. Throughout 2001, TCE was below its limit, the pH was between the permit limits of 6.0 and 9.0 and there was no foam or oil sheen.

A 24-hour recovery test was performed using the Magnolia Member wells on December 5 and 6, 2001. The test was performed as outlined in the 2000-2005 Operations and Monitoring Plan. The purpose of the test was to determine if Magnolia pump-out wells MG1 and MG2 are maintaining an adequate capture zone in the Platteville Formation. The recovery test involved measuring water levels in wells RR, SS, VV, OO, TT and WW prior to and 24 hours after a shutdown of pump-out wells MG1 and MG2.

Comparison of the 1992 drawdown data with the 2001 recovery data (2001 recovery minus 1992 drawdown) indicates that for each monitoring well, the recovery exceeds the initial drawdown measured during system startup, ranging from 2.18 feet in well WW to 8.95 feet in well TT (Table 15). Since the start up drawdowns were shown to provide adequate capture, and the 2001 drawdowns all exceed the startup drawdowns, it follows that the Magnolia pump-out system maintained adequate capture in 2001.

5.3.2 Magnolia Monitoring Wells

The analyses of samples from Magnolia Member wells indicate no detection of TCE in the sample from well QQ. TCE concentrations of 9.6 µg/L and 8.4 µg/L were measured in samples from wells 14 and TT, respectively (Table 8). Figure 14 shows TCE concentrations over time in samples from wells QQ and TT.

Prior to start up of the Magnolia pumping wells, samples from well TT contained about 25 µg/L TCE and samples from well TT contained about 8 µg/L TCE. Following start up of pumping, TCE concentrations at both wells TT and QQ declined to less than 5 µg/L. Well 14 was installed in 1998 to provide an additional downgradient monitoring point. It appears that TCE has increased to about 8 µg/L at both wells TT and 14. While it is possible that downward leakage of higher TCE concentrations from the Carimona member could be affecting the results at well TT, this does not appear to be a possibility at well 14. TCE remains higher in the Magnolia pumping well samples than in the monitoring well samples, and TCE concentrations remain below the Consent Order level of 27 µg/L in all samples. The pumping rates, the recovery test data, and the water quality data show that pump-out wells MG1 and MG2 continue to effectively capture Platteville Formation groundwater and control the extent of the TCE concentration specified in the Consent Order.

5.3.3 BTEX in the Magnolia Member

BTEX compounds were not detected in the samples from the Magnolia monitoring wells, nor in the Magnolia pumping well samples.

5.4 St. Peter Sandstone

Water elevations in St. Peter monitoring wells 200, 201, 202 and 203 were consistent with historic water elevations, and the potentiometric levels (Figure 8) indicate the direction of groundwater flow is to the southwest, consistent with regional flow in the St. Peter Sandstone and historic data from the site.

Historically, TCE concentrations have been highest in samples from well 200, which is a few hundred feet downgradient of the site. From initial site work through 1997, samples from well 200 contained about 100 µg/L TCE. After 1997, the concentrations dropped off sharply and steadily to non-detect in 2000, and a slight rebound to 6.4 µg/L in 2001.

Consistent with historic results, TCE concentrations were not detectable in the sample from well 202. The 2001 sample from well 203 contained 15 µg/L TCE, a slight increase over historic concentrations.

None of the BTEX compounds were detected in the samples from the St. Peter monitoring wells.

5.5 Prairie du Chien/Jordan

The results from the analyses of the sample collected from the Henkel well during 2001 contained 7.1 µg/L TCE. This is the first time TCE has been detected in the Henkel well since 1998. This amount of TCE is consistent with analytical data from 1993 through 1998, and is much lower than the concentrations when monitoring began in the mid-1980s (near 50 µg/L).

None of the BTEX compounds were detected in the sample from the Prairie du Chien/Jordan aquifer monitoring well.

6.0 Conclusions

1. The 2001 operations and maintenance were consistent with historic O&M. The remediation system is about 15 years old, and remaining original equipment is beginning to wear, leading to slightly more maintenance each year, but this should not affect overall performance of the system. No emergency or contingency actions were necessary in 2001. Table 17 summarizes monitoring and maintenance completed in 2001.

2. The stripper media was changed out in December. General Mills continues to evaluate the performance of a pre-treatment unit, and has installed an updated version.

3. All water level data are consistent with historic data, and the groundwater flow patterns in the various aquifers appear to have stayed constant.

4. The 2001 water quality monitoring results are generally consistent with historic results. The monitoring program appears to be appropriate and adequate for the site. As discussed in the following paragraphs, water quality remains stable at most wells, but there have been some significant declining trends.

5. Groundwater produced by glacial aquifer pumping well 110 continues to have TCE concentrations above the Consent Order limit of 270 µg/L, but this is the only well where this is the case. TCE concentrations appear to be declining in the on site glacial aquifer pump out wells, and appear stable in the downgradient glacial aquifer pumping wells and monitoring wells. Most downgradient monitoring well samples contain less than 10 µg/L TCE.

6. The Carimona Member acts as a leaky confining layer between the glacial drift and the Magnolia Member. TCE in samples from the Carimona member dropped by one to two orders of magnitude, and have remained stable at less than 100 µg/L for many years. The TCE concentrations remain above the Consent Order limit of 27 µg/L in a number of wells, indicating that remediation should continue.

7. The Magnolia Member pump-out wells have a greater influence on the vertical gradient than did Carimona pump-out well 108. The increased hydraulic gradient causes increased leakage from the Carimona Member into the Magnolia Member, and allows for greater capture of affected groundwater. The Magnolia Member pump-out wells MG1 and MG2 effectively act as containment wells for lateral flow of groundwater in the Carimona Member, per the Consent Order, and in the Magnolia member.

The Magnolia Member recovery test data indicate that pump-out wells MG1 and MG2 are maintaining equal or better capture compared to their initial assessment. The highest TCE concentrations from the Magnolia member are detected in the samples from pumping well MG1. The TCE concentrations in all Magnolia member samples from 2001 were below the Consent Order limit if 27 µg/L. However, given the concentrations detected in the Carimona member and the glacial aquifer, pumping of the Magnolia wells should continue.

8. In the last four years, TCE concentrations have declined dramatically in St. Peter aquifer well 200, which is closest to the site, from about 100 µg/L to near non-detect. TCE concentrations may be increasing slightly in samples from well 203 (which is downgradient of well 200), but remain much lower than have been detected historically in samples from well 200.

9. Trichloroethene was detected in the Henkel well sample (7.1 µg/L), for first time since 1998. The 2001 concentration is consistent with results from 1993 through 1998, and much lower than when monitoring began in the mid-1980s.

10. At the request of the MPCA, General Mills completed an investigation of the shallow soils near the former disposal site. The results were consistent with the site history, and the MPCA confirmed no further site remediation is necessary.

11. At the request of the MPCA, General Mills has reported and evaluated benzene, ethylbenzene, toluene, and xylene results in the 2001 water quality monitoring data. There were only a few reported detections of BTEX compounds in the shallow aquifers, and the data as a whole suggest that this site is not a significant source of these compounds.

7.0 Recommendations for 2002

1. Continue operation and maintenance of the onsite pump-out and groundwater treatment systems and the downgradient glacial drift pump-out system in accordance with the 1984 Consent Order and other regulatory documents.

2. Inspect the groundwater pump-out wells and treatment systems on at least a monthly basis.

3. Submit treatment system and pump-out system monitoring results on a quarterly basis per the NPDES permit.

4. Monitor groundwater elevations and groundwater quality in accordance with the 2000–2005 Operations and Monitoring Plan.

5. Continue evaluating the hardness pretreatment system and conclude the evaluation during 2002 and propose a recommendation.

6. Collect and analyze pump-out well-specific samples during one quarter in 2002.

7. Discontinue monitoring of benzene, ethyl benzene, toluene and xylene.

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MPCA, October 25, 1984. Administrative Consent Order.

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Tables

Table 1
2001 Groundwater Elevations
Glacial Drift Wells
(elevations in feet-MSL)

Location	Q	S	T	V	W	X
Date	12/4/01	12/4/01	12/4/01	12/4/01	12/4/01	12/4/01
Water Elevation	828.57	827.31	832.50	817.44	817.53	822.85

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Table 2
2001 Groundwater Elevations
Carimona Member Wells
(elevations in feet-MSL)

Location	RR	SS	UU	WW
Date	12/4/2001	12/4/2001	12/4/2001	12/4/2001
Water Elevation	830.04	823.32	829.92	829.94

Location	8	9	10	11	12
Date	12/4/2001	12/4/2001	12/4/2001	12/4/2001	12/4/2001
Water Elevation	829.90	830.10	830.10	829.95	828.78

Table 3
2001 Groundwater Elevations
Magnolia Member Wells
(elevations in feet-MSL)

Location	OO	QQ	TT	VV	14
Date	12/4/2001	12/4/2001	12/4/2001	12/4/2001	12/4/2001
Water Elevation	819.80	819.93	816.88	822.23	816.46

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Table 4
2001 Groundwater Elevations
St. Peter Sandstone Wells
(elevations in feet-MSL)

Location	200	201	202	203
Date	12/4/01	12/4/01	12/4/01	12/4/01
Water Elevation	766.10	780.84	754.72	754.08

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Table 5
2001 Water Quality Data
Glacial Drift
(concentrations in ug/L)

Location Date	Q 12/5/01	T 12/6/01	V 12/6/01	W 12/6/01	X 12/6/01	Consent Order Limit
Trichloroethylene	1.6	<1.0	91	14	<1.0	**270**
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	--
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	--
Ethyl benzene	<1.0	<1.0	<1.0	<1.0	<1.0	--
Xylenes total	<3.0	<3.0	<3.0	<3.0	<3.0	--

-- No consent order limit.

Table 6
2001 Water Quality Data
Carimona Member Wells
(concentrations in ug/L)

Location Date	SS 12/5/01	UU 12/5/01	8 12/10/01	9 12/10/01	10 12/10/01	11 12/5/01	12 12/5/01	Consent Order Limit
Trichloroethylene	2.0	**56**	**57**	2.2	27	**70**	1.1	**27**
Benzene	<1.0	<1.0	6.5	12	<1.0	3.5	<1.0	--
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--
Ethyl benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--
Xylenes total	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	--

-- No consent order limit.

Table 7
2001 Water Quality Data
Magnolia Member Wells
(concentrations in ug/L)

Location Date	QQ 12/6/01	TT 12/5/01	14 12/5/01	Consent Order Limit
Trichloroethylene	<1.0	8.4	9.6	27
Benzene	<1.0	<1.0	<1.0	--
Toluene	<1.0	<1.0	<1.0	--
Ethyl benzene	<1.0	<1.0	<1.0	--
Xylenes total	<3.0	<3.0	<3.0	--

-- No consent order limit.

Table 8
2001 Water Quality Data
St. Peter Sandstone Wells
(concentrations in ug/L)

Location Date	200 12/7/01	202 12/10/01	203 12/10/01	Consent Order Limit
Trichloroethylene	6.4	<1.0	15	27
Benzene	<1.0	<1.0	<1.0	--
Toluene	<1.0	<1.0	<1.0	--
Ethyl benzene	<1.0	<1.0	<1.0	--
Xylenes total	<3.0	<3.0	<3.0	--

-- No consent order limit.

Table 9
2001 Water Quality Data
Prairie Du Chien/Jordan Well
(concentrations in ug/L)

Location Date	HENKEL 12/7/01
Trichloroethylene	7.1
Benzene	<1.0
Toluene	<1.0
Ethyl benzene	<1.0
Xylenes total	<3.0

Table 10
2001 Water Quality Data
Downgradient Glacial Drift Pump-Out System
(concentrations in ug/L)

Location Date Dup	111 2/28/01	112 2/28/01	113 2/28/01	Flow Weighted Discharge 2/28/01	Discharge 5/18/01	111 8/30/01	111 8/30/01 DUP	113 8/30/01	Flow Weighted Discharge 8/30/01	111 11/15/01	111 11/15/01 DUP	112 11/15/01	113 11/15/01	Flow Weighted Discharge 11/15/01
1,1,1-Trichloroethane	2.9	1.7	3.0	NC	2.1	1.5	<1.0	<2.0	NC	4.2	4.0	3.3	5.0	NC
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
1,1-Dichloroethane	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
1,2-Dichloroethane	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
1,2-Dichloroethylene, cis	<1.0	1.2	31	NC	14	<1.0	<1.0	27	NC	<1.0	<1.0	<1.0	20	NC
1,2-Dichloroethylene, trans	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
Benzene	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
Ethyl benzene	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0	<2.0	--
Tetrachloroethylene	<1.0	1.6	3.5	NC	2.1	<1.0	<1.0	3.3	NC	<1.0	<1.0	1.6	3.8	NC
Toluene	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
Trichloroethylene	2.7	54	**150**	**70**	**75**	1.0	1.2	140	**68.8**	1.7	1.8	32	110	**38.9**
Vinyl chloride	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC	<1.0	<1.0	<1.0	<2.0	NC
Xylenes total	<3.0	<3.0	<6.0	NC	<3.0	<3.0	<3.0	<6.0	NC	<3.0	<3.0	<3.0	<6.0	NC
Sum Volatile Organics	5.6	59	**190**	**87**	**93**	2.5	1.2	170.3	**83.8**	5.9	5.8	37	140	**50**

-- Not analyzed.

NC Flow weighted average not calculated for these individual contaminants.

Table 11
2001 Water Quality Data
Site Glacial Drift Pump-Out and Treatment Systems
(concentrations in ug/L)

Location Date	109 2/28/01	110 2/28/01	Flow weighted Site Glacial Drift Influent Average 2/28/01	INF 5/18/01	109 * 8/30/01	109 11/15/01	110 11/15/01	Flow weighted Site Glacial Drift Influent Average 11/15/01	EFF ** 2/28/01	EFF ** 5/18/01	EFF ** 8/30/01	EFF ** 11/15/01
1,1,1-Trichloroethane	<2.0	<5.0	NC	<5.0	<2.0	5.1	<5.0	NC	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<2.0	<5.0	NC	<5.0	<2.0	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	<2.0	<5.0	NC	<5.0	<2.0	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	<2.0	<5.0	NC	<5.0	<2.0	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene, cis	2.4	38	NC	26	3.8	10	59	NC	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene, trans	<2.0	<5.0	NC	<5.0	<2.0	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
Benzene	<2.0	<5.0	NC	<5.0	2.8	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	--	--	NC	--	--	<2.0	<5.0	NC	--	--	--	<1.0
Tetrachloroethylene	4.0	6.3	NC	5.5	<2.0	4.8	8.4	NC	<1.0	<1.0	<1.0	<1.0
Toluene	<2.0	<5.0	NC	21	25	2.8	<5.0	NC	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	140	270	215	230	140	160	290	213	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	<2.0	<5.0	NC	<5.0	<2.0	<2.0	<5.0	NC	<1.0	<1.0	<1.0	<1.0
Xylenes total	<6.0	<15	NC	<15	18	<6.0	<15	NC	<3.0	<3.0	<3.0	<3.0
Sum Volatile Organics	150	310	242	280	189.6	180	360	254	ND	ND	ND	ND

-- Not analyzed.

NC Flow weighted average not calculated for these individual contaminants.

* Pump malfunction at well 110, no sample taken.

** Effluent limit for TCE - 50 ug/L average and 100 ug/L instantaneous

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Table 12
2001 Water Quality Data
Magnolia Pump-Out System
(concentrations in ug/L)

Location Date Dup	MG1 2/28/01	MG2 2/28/01	MG2 2/28/01 DUP	Flow Weighted MG Discharge Average 2/28/01	MGEFF 5/18/01	MGEFF 5/18/01 DUP	MG1 8/30/01	MG2 8/30/01	Flow Weighted MG Discharge Average 8/30/01	MG1 11/15/01	MG2 11/15/01	Flow Weighted MG Discharge Average 11/15/01
1,1,1-Trichloroethane	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	1.4	<1.0	NC
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
1,1-Dichloroethane	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
1,2-Dichloroethane	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
1,2-Dichloroethylene, cis	2.1	1.9	4.3	NC	2.2	2.3	2.6	3.2	NC	2.3	2.4	NC
1,2-Dichloroethylene, trans	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
Benzene	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
Ethyl benzene	--	--	--	NC	--	--	--	--	NC	<1.0	<1.0	NC
Tetrachloroethylene	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
Toluene	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
Trichloroethylene	**22**	10	**25**	**20.2**	**15**	**16**	**22**	12	**17.1**	**18**	11	**14.5**
Vinyl chloride	<1.0	<1.0	<1.0	NC	<1.0	<1.0	<1.0	<1.0	NC	<1.0	<1.0	NC
Xylenes total	<3.0	<3.0	<3.0	NC	<3.0	<3.0	<3.0	<3.0	NC	<3.0	<3.0	NC
Sum Volatile Organics	**24**	12	**29**	**23.2**	17	**18**	**24.6**	15.2	**20**	**22**	13	**17.5**

-- Not analyzed.

NC Flow weighted average not calculated for these individual contaminants.

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Table 13

2001 Pumping Rate Summary

	Glacial Drift Pumpout Well Average Pumping Rate (gpm)					Magnolia Pumpout Well Average Pumping Rate (gpm)	
	109	**110**	**111**	**112**	**113**	**MG1**	**MG2**
Target Pumping Rate (Average Monthly gpm)	30	50	90	100	90	100	100
Action Level (Average Monthly gpm)	20	40	80	80	80	80	80
January 2001	42	49	107	78[1]	106	105	83
February 2001	41	49	107	78[1]	106	99	76
March 2001	37	50	106	79[1]	105	99	91
April 2001	39	51	106	85	105	98	109
May 2001	14[2]	52	108	92	105	97	119
June 2001	12[2]	52	107	92	104	96	115
July 2001	71	53	113	94	108	97	98
August 2001	64	28[4]	106	16[3]	101	94	92
September 2001	66	17[4]	107	75[1]	76[5]	99	98
October 2001	68	54	109	76[1]	0[5]	99	104
November 2001	74	54	108	76[1]	64[5]	101	103
December 2001	63	44	108	78[1]	103	83	86
2001 Average monthly GPM	49	46	108	77[3]	90	97	98
2000 Average monthly GPM	43	40	94	47	100	104	95

(1) Low water table affects the production rate.

(2) Equipment malfunction.

(3) Meter failure due to bio-fouling. Actual pumping rate likely greater that Action Limit.

(4) Mechanical failure of pump—pump replaced.

(5) Mechanical failure of meter. Actual pumping rate likely greater that Action Limit.

Table 14

Recovery Test Comparison Summary

Well	Pumping Levels in Ft. MSL		Non-Pumping Levels in Ft. MSL		Recovery (ft) 12/6/01	Drawdown (ft) 1992 Test	2001 Δ^1 (ft)	2000 Δ^2 (ft)
	10/1/92 (for 8 days)	12/5/01 (for 9 years)	9/22/92	12/6/01				
RR	828.21	830.04	829.81	832.23	2.19	1.60	0.59	0.66
OO	819.64	819.80	825.69	827.37	7.57	6.05	1.52	1.46
SS	824.57	823.32	827.31	829.43	6.11	2.74	3.37	2.60
TT	816.65	816.88	823.22	825.83	8.95	6.57	2.38	2.21
VV	821.33	822.23	826.96	828.32	6.09	5.23	0.86	0.91
WW	828.08	829.94	829.71	832.12	2.18	1.63	0.55	0.63

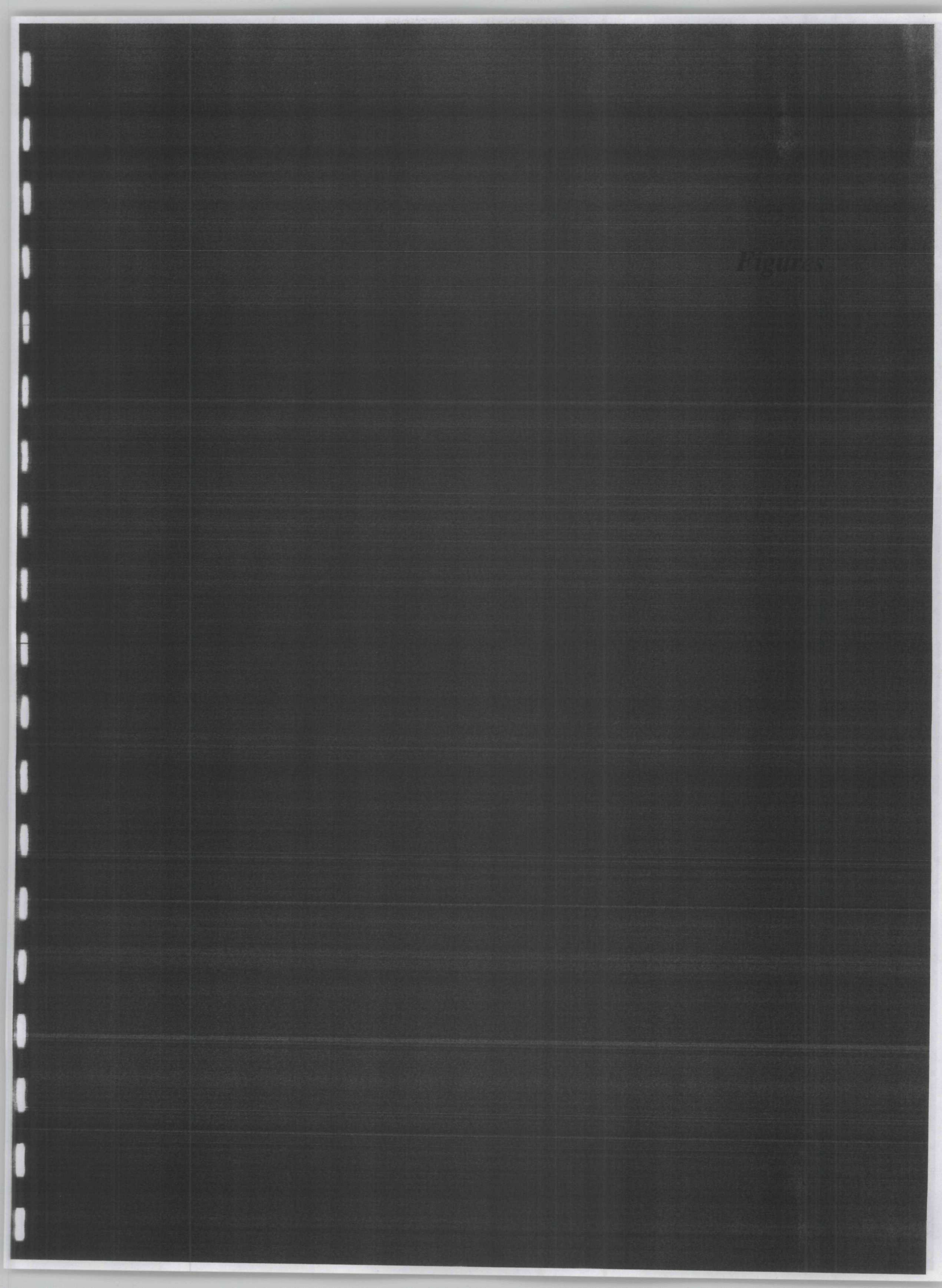
Δ^1 = Recovery (12/6/01) – Drawdown (1992 test)

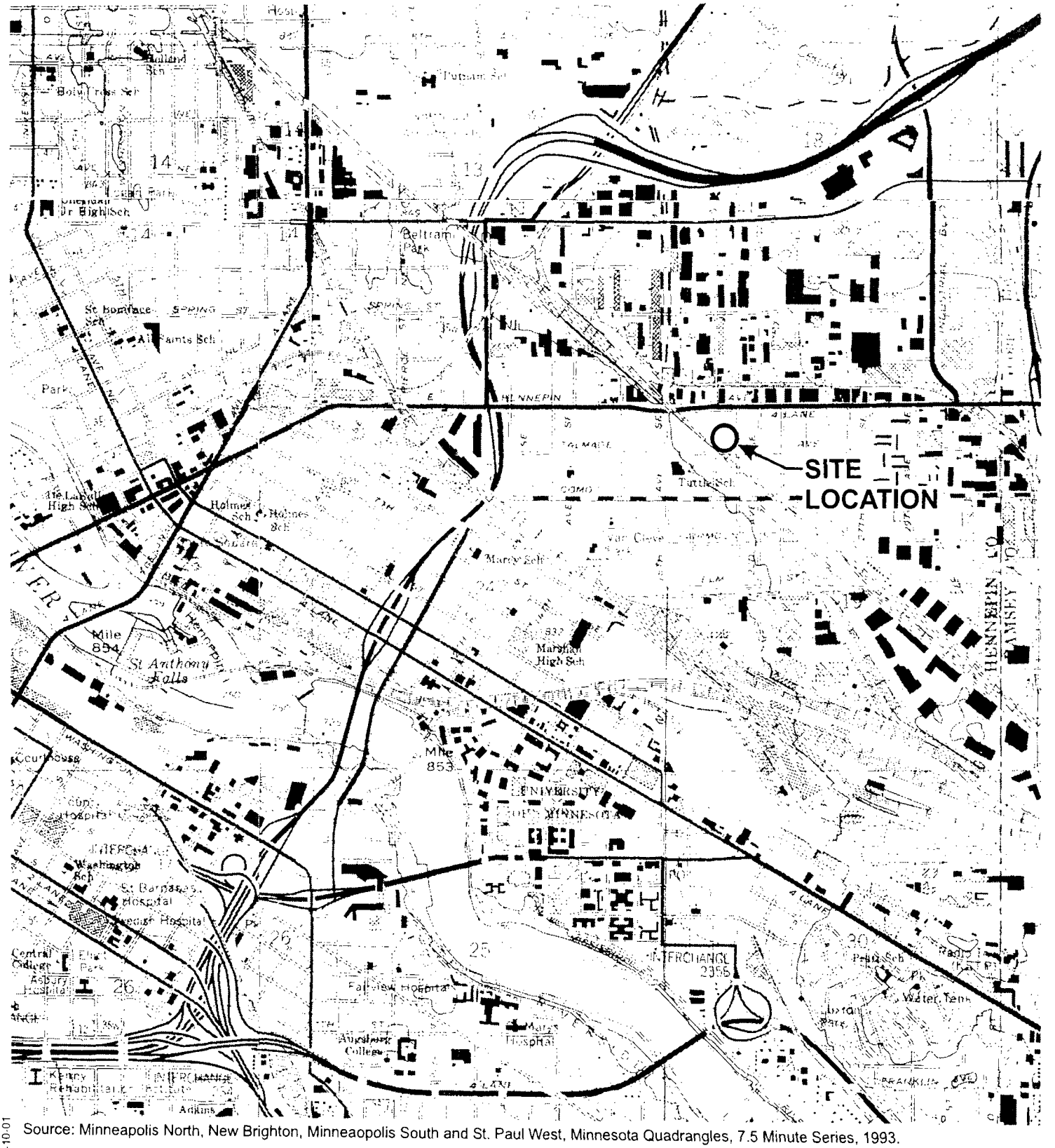
Δ^2= Recovery (11/22/00) – Drawdown (1992 test)

Table 15

Summary of 2001 Activities

2001	Monitoring and Reporting	O&M
January	3th – Site inspection 18th – Quarterly NPDES Report to GMI/MPCA 19th – 2000 Water Appropriations Worksheets submitted	
February	1st – Site Inspection 28th – Discharge monitoring 28th – Submitted 2000 Annual Report (Due 3/1)	
March	6th – Site Inspection	12th – Repaired leak on MG2
April	2th – Site inspection 18th – Quarterly NPDES report to GMI/MPCA	10th – Repaired 111 cap and wires; leak on MG2
May	4th – Site Inspection 15th – Discharge monitoring	
June	1st – Site Inspection	29th – Pulled pump in 109; treated well; pigged line on MG1
July	5th – Site Inspection 12th – Quarterly NPDES report to GMI/MPCA 30th – Site Inspection	
August	30th – Discharge monitoring 30th – Shallow soil investigation report submitted to MPCA	7th – Switched out Frieje pretreatment units
September	5th – Site inspection	4th – Repaired 112 meter (biofouled) 19th – Replaced pump in 110; replaced sample valves on 111,112,113
October	3rd – Site inspection 15th – Quarterly NPDES Report to GMI/MPCA (corrections on 10/22)	
November	2nd – Site inspection 15th – Discharge monitoring	
December	4th – Site inspection 4th – 10th – Annual site monitoring event and Magnolia Member recovery rate tests	6th – 11th – Replaced stripper media





Source: Minneapolis North, New Brighton, Minneapolis South and St. Paul West, Minnesota Quadrangles, 7.5 Minute Series, 1993.

N

0 2000 4000

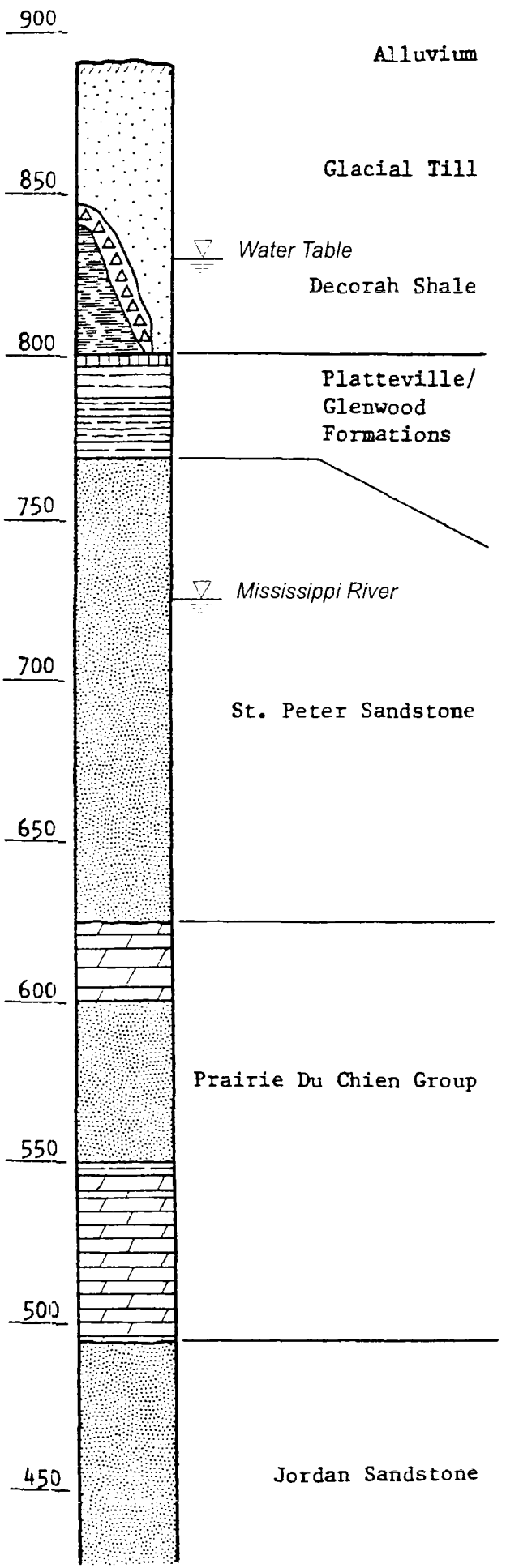
Scale in Feet

QUADRANGLE LOCATION

Figure 1

EAST HENNEPIN AVENUE SITE
REGIONAL LOCATION MAP

P:\2327169\Figu reralMillSiteLoc.CDR jfn 1-10-01



Sand, gravelly sand and silty sand, sometimes overlain by bogs and marshes which have been drained and filled. Overlying soil is variable in composition often clayey or silty. Deposits are terrace deposits from Glacial River Warren. Thickness ranges from 23 to 57 feet.

Gray and red tills associated with Des Moines and Superior lobes. Unsorted material with variable texture containing clay sizes and boulders. Sometimes underlain by thin layer of alluvium. Contains sand lenses. Absent in many places, up to 20' thick.

Greenish-gray to olive-gray claystone, fissile, fossiliferous, contains several limestone layers. Patchy in this area. Thicknesses range up to 50'.

Carimona member - micrite, fossiliferous, often fractured and weathered, 3.5-4.5' thick.
Magnolia member - fossiliferous micrite, calcitic shale, with rippled bedding, corroded zones, some fractures. 8.5-9' thick.
Hidden Falls - micrite, shaly, fossiliferous, 6-7' thick.
Mifflin member, thin beds of limestone, interbedded shale 12-13' thick.
Pecatonica member - dolomite, hard, 1-1.5' thick.
Glenwood shale - green shale, sandy at the base, 3-5' thick.

Light yellow or white, medium grained, massive appearing sandstone composed of rounded and subrounded grains. Thin beds of green shale are present. Ranges in thickness from 150-170'.

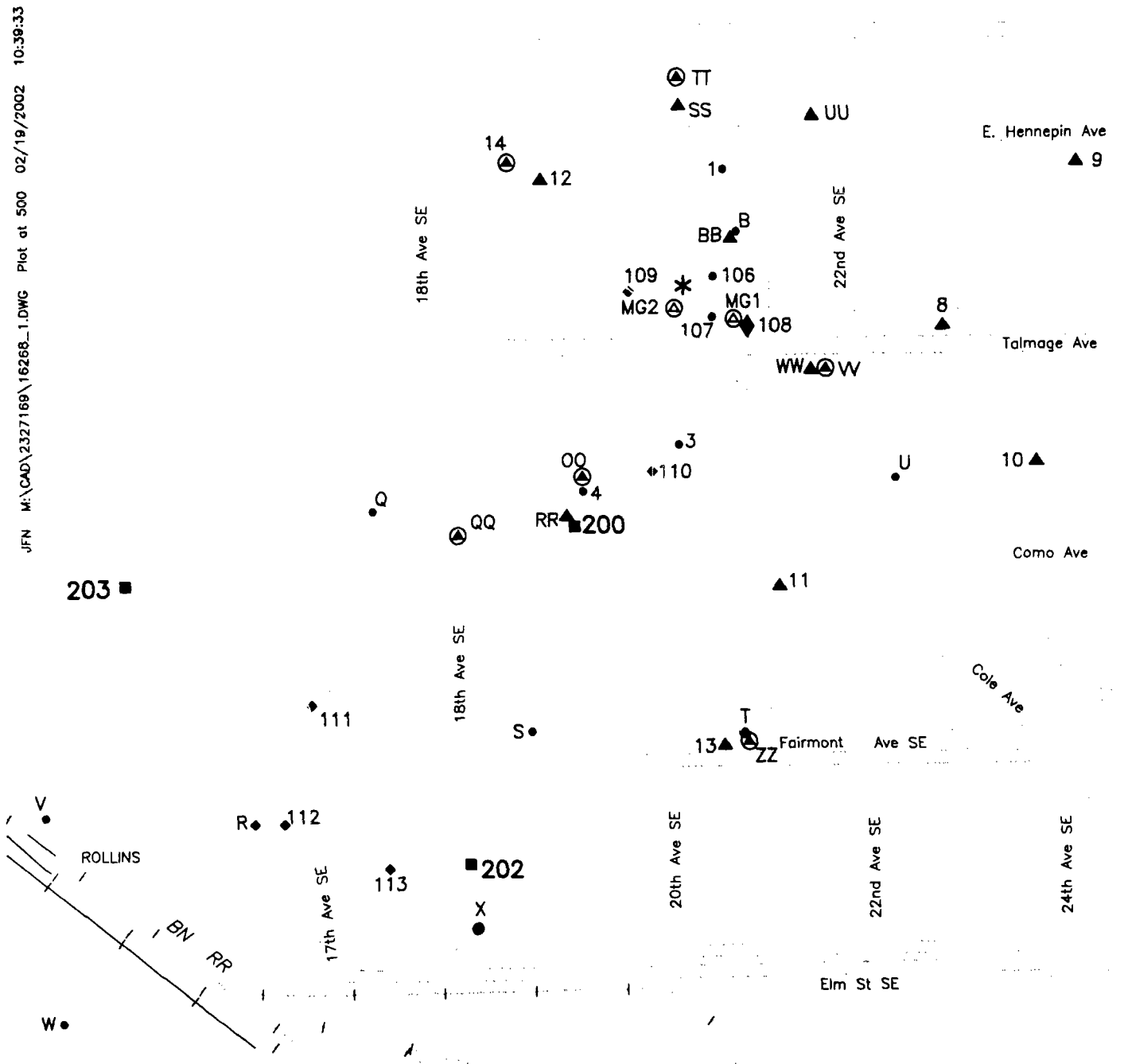
Thickness of entire formation is 120'-150'.
Oneota Dolomite - thin to thick bedded, light brownish gray or buff, fine- to medium-grained dolomite, silt sized dolomite matrix.
New Richmond Sandstone - fine- to medium-grained quartzose sandstone and quartzitic dolomite, minor amounts of shale and pure dolomite.
Willow River Dolomite - thin to thick bedded dolomite, sandy dolomite with some interbedded quartzose sandstone.

Argillaceous and dolomitic quartz sandstone with pebble-size clasts of dolomitic sandstone and thin beds of dolomite, white or yellow, coarse to medium-grained orthoquartzites to yellow, silty, fine grained quartzose sandstone. 85-100' thick. Underlain by the St. Lawrence Formation which is 120'-200' thick and contains a variety of silty or sandy dolomitic rocks.

Figure 2

GENERALIZED GEOLOGIC COLUMN

P:2327169\GeoColumn.CDR jfn 2-19-02



- ● GLACIAL DRIFT MONITORING WELL
- ◆ SITE AND DOWNGRADIENT GLACIAL DRIFT PUMP–OUT WELL
- ■ ST. PETER SANDSTONE MONITORING WELL
- ✱ FORMER DISPOSAL SITE
- ▲ CARIMONA MEMBER MONITORING WELL
- ♦ CARIMONA MEMBER PUMP–OUT WELL
- MAGNOLIA MEMBER MONITORING WELL
- MAGNOLIA MEMBER PUMP–OUT WELL

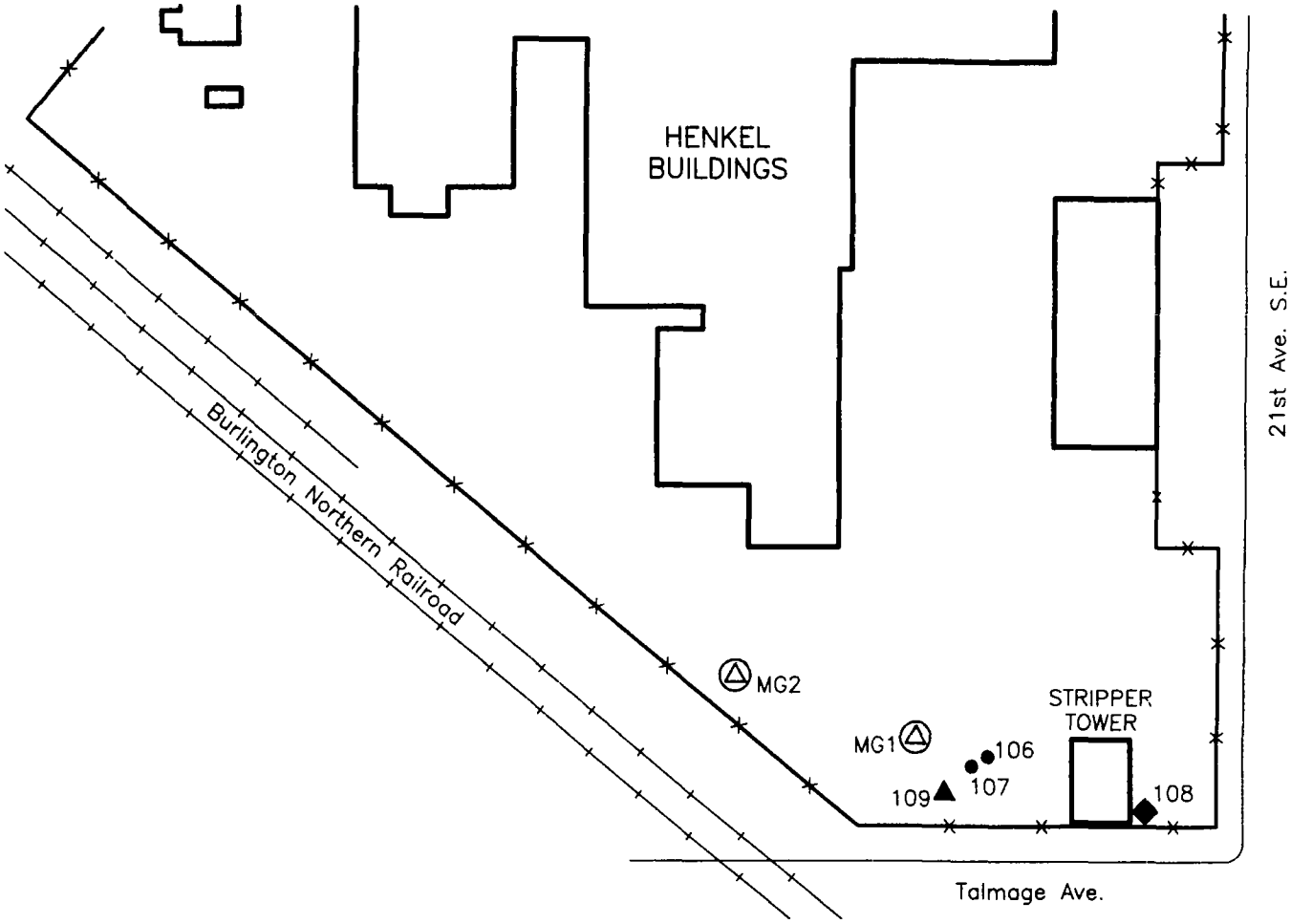
N

0 500 1000

SCALE IN FEET

Figure 3

SITE MONITORING WELL LOCATIONS



0 80 160

SCALE IN FEET

▲ Glacial Drift Pump–Out Well

◆ Carimona Member Pump–Out Well (Shut Down September 1992)

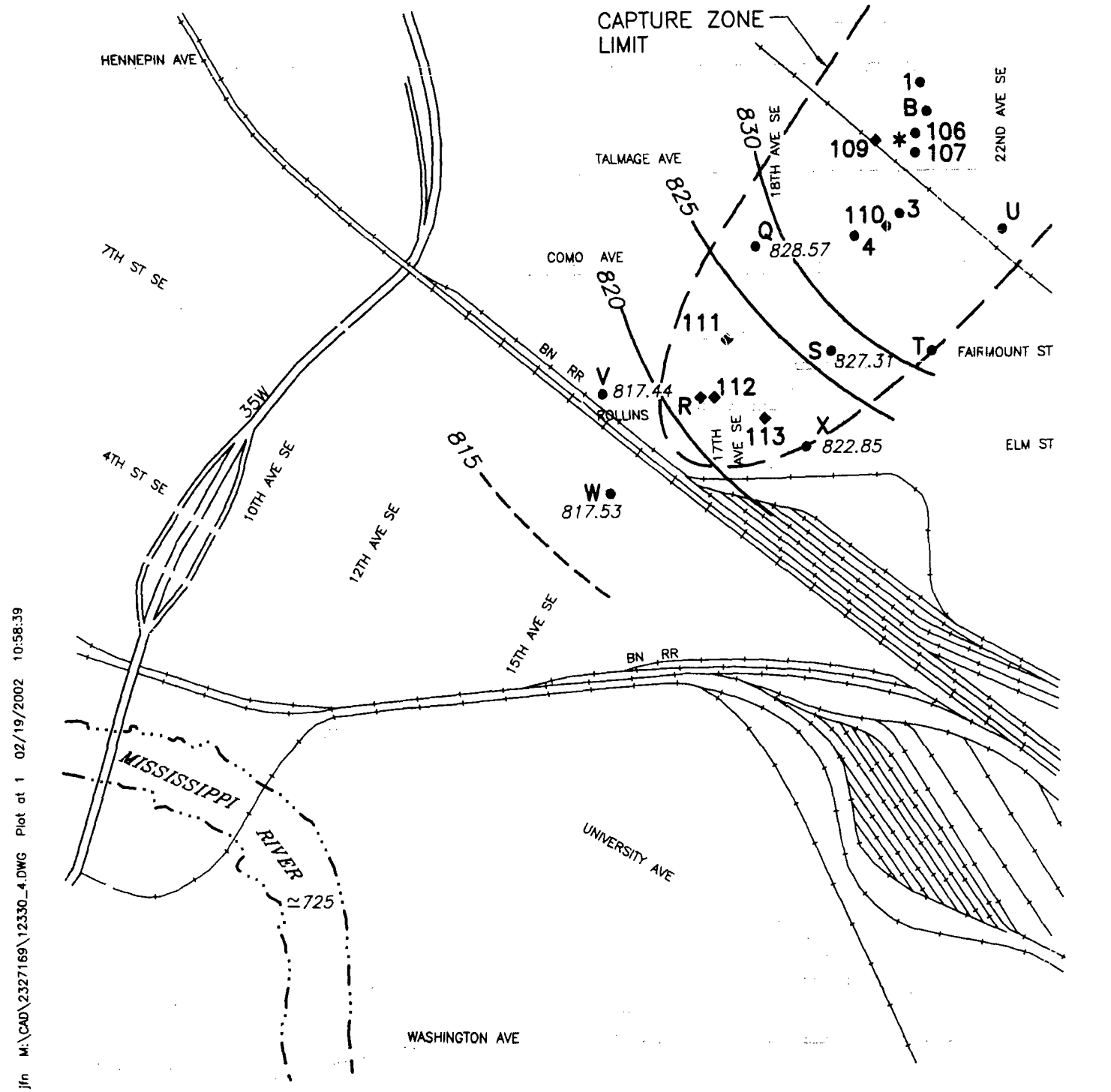
Ⓐ Magnolia Member Pump–Out Well

● Monitoring Well

jfn M:\CAD\2327169\14229_1.DWG Plot at 80 02/19/2002 10:44:55

Figure 4

EAST HENNEPIN AVENUE
SITE MAP



- GLACIAL DRIFT MONITORING WELL
- SITE AND DOWNGRADIENT GLACIAL DRIFT PUMP-OUT WELL
- 817.44 GLACIAL DRIFT WATER TABLE ELEVATION (MSL)
- —820— GLACIAL DRIFT WATER TABLE CONTOUR (MSL)
- — — — CAPTURE ZONE
- * FORMER DISPOSAL SITE

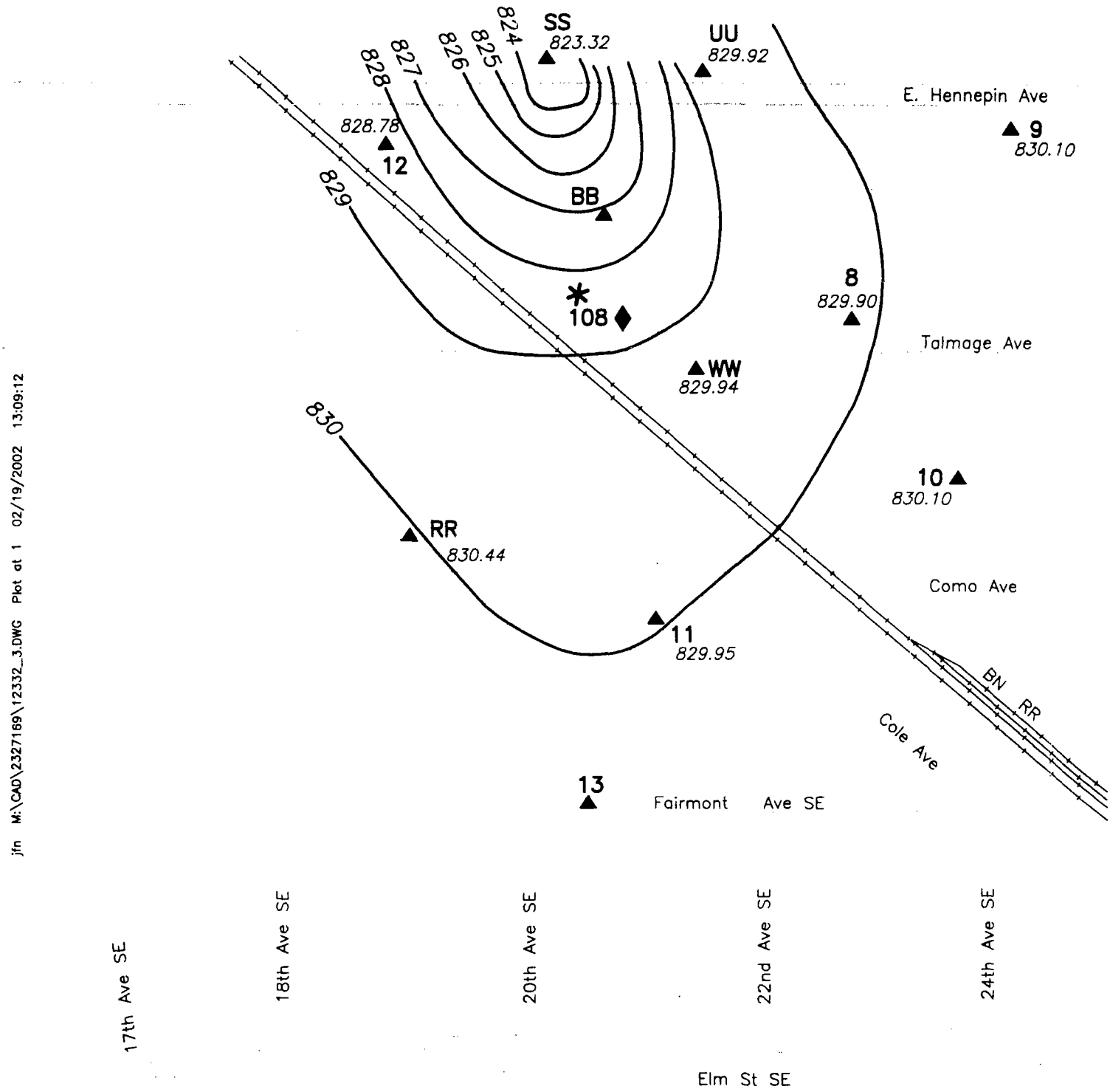
N

0 1000 2000

SCALE IN FEET

Figure 5

GLACIAL DRIFT AQUIFER
WATER TABLE ELEVATIONS
December 4, 2001



▲ CARIMONA MEMBER MONITORING WELL

♦ FORMER CARIMONA MEMBER PUMP-OUT WELL

830.44 CARIMONA POTENTIOMETRIC SURFACE ELEVATION (MSL)

—*828*— CARIMONA POTENTIOMETRIC SURFACE CONTOUR (MSL)

✱ FORMER DISPOSAL SITE

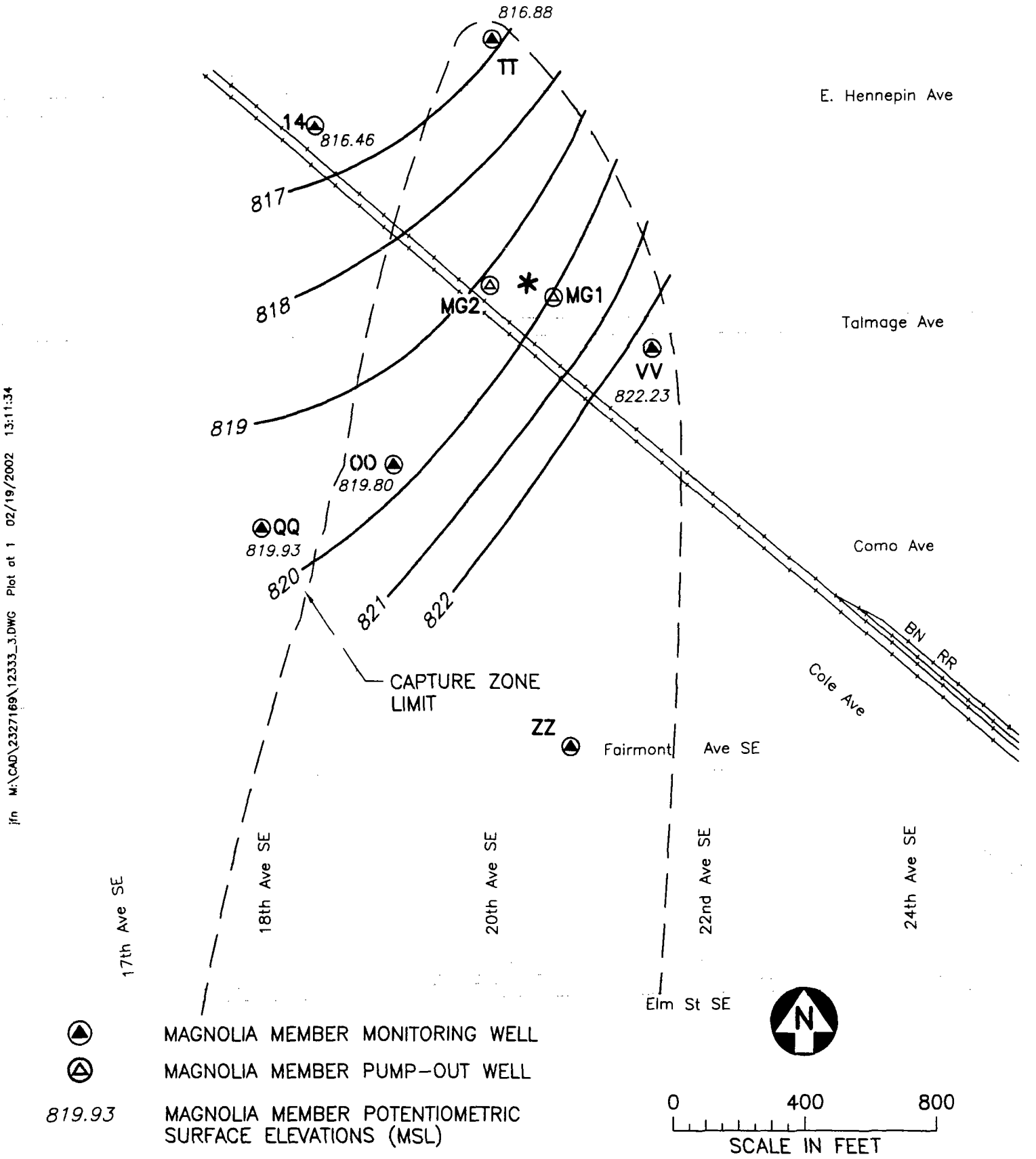
N

0 400 800

SCALE IN FEET

Figure 6

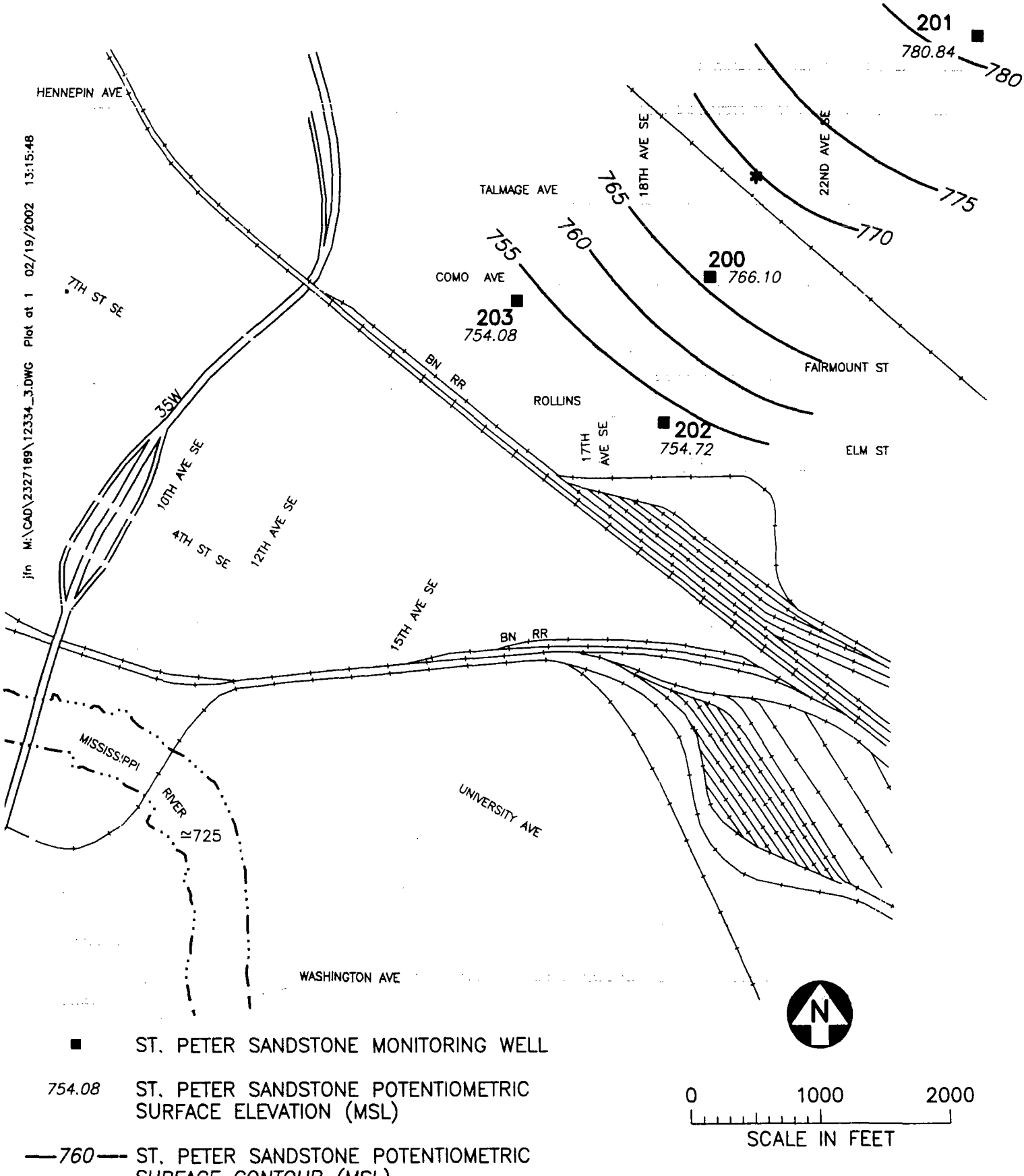
CARIMONA MEMBER
POTENTIOMETRIC SURFACE ELEVATIONS
December 4, 2001



jfn M:\CAD\2327169\12333_3.DWG Plot at 1 02/19/2002 13:11:34

Figure 7

MAGNOLIA MEMBER
POTENTIOMETRIC SURFACE ELEVATIONS
December 4, 2001



■ ST. PETER SANDSTONE MONITORING WELL

754.08 ST. PETER SANDSTONE POTENTIOMETRIC SURFACE ELEVATION (MSL)

—760— ST. PETER SANDSTONE POTENTIOMETRIC SURFACE CONTOUR (MSL)

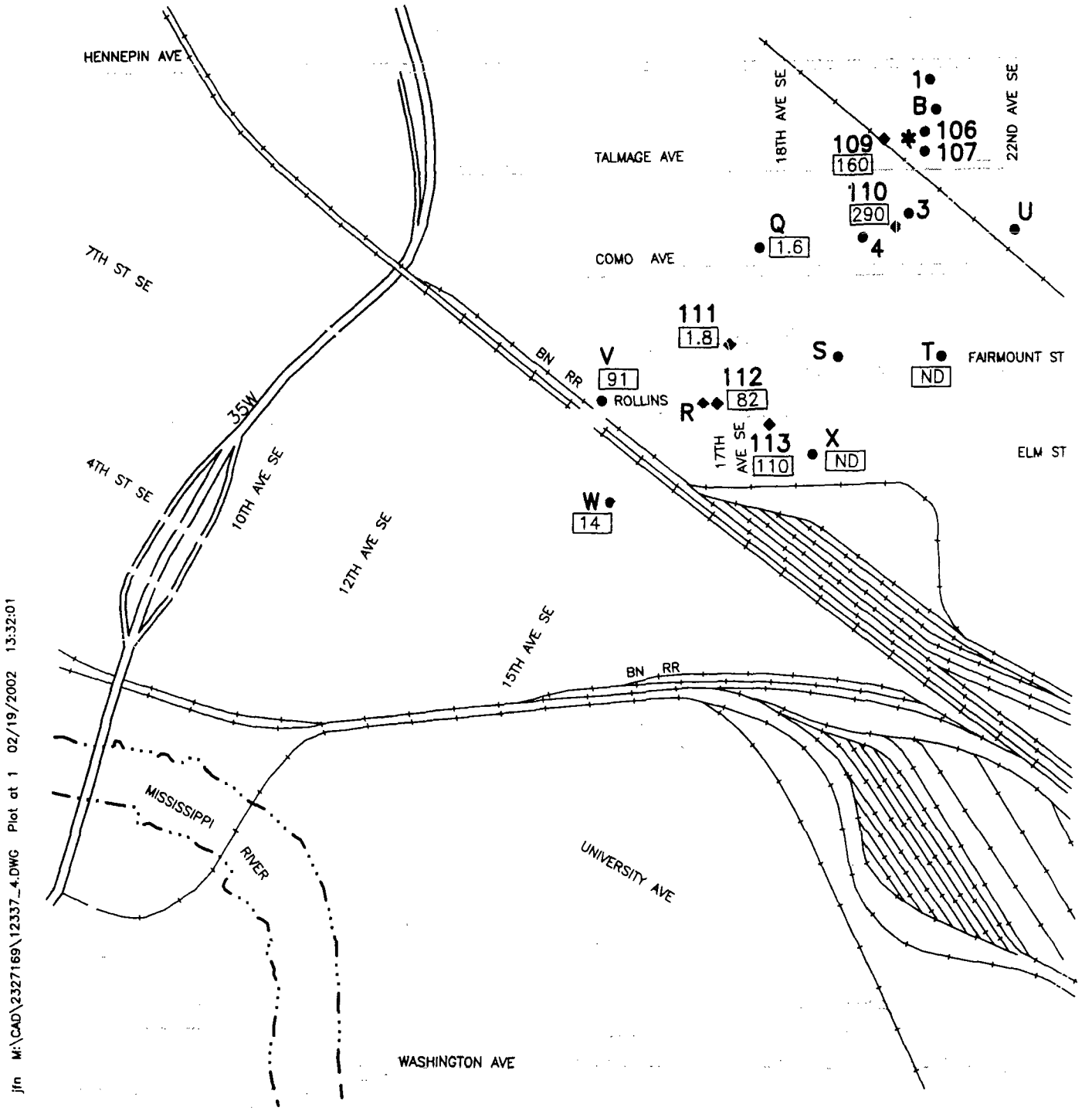
✱ FORMER DISPOSAL SITE

0 1000 2000

SCALE IN FEET

Figure 8

ST. PETER SANDSTONE
MONITORING WELL LOCATIONS AND
POTENTIOMETRIC SURFACE ELEVATIONS
December 4, 2001



jfn M:\CAD\2327169\12337_4.DWG Plot at 1 02/19/2002 13:32:01

- ● GLACIAL DRIFT MONITORING WELL
- ◆ SITE AND DOWNGRADIENT GLACIAL DRIFT PUMP-OUT WELL
- [1.6] TRICHLOROETHYLENE CONCENTRATION (TCE) (ug/L)
- [ND] NOT DETECTED
- ✱ FORMER DISPOSAL SITE

N

0 1000 2000

SCALE IN FEET

Figure 9

GLACIAL DRIFT
GROUNDWATER QUALITY (TCE)
November 2001

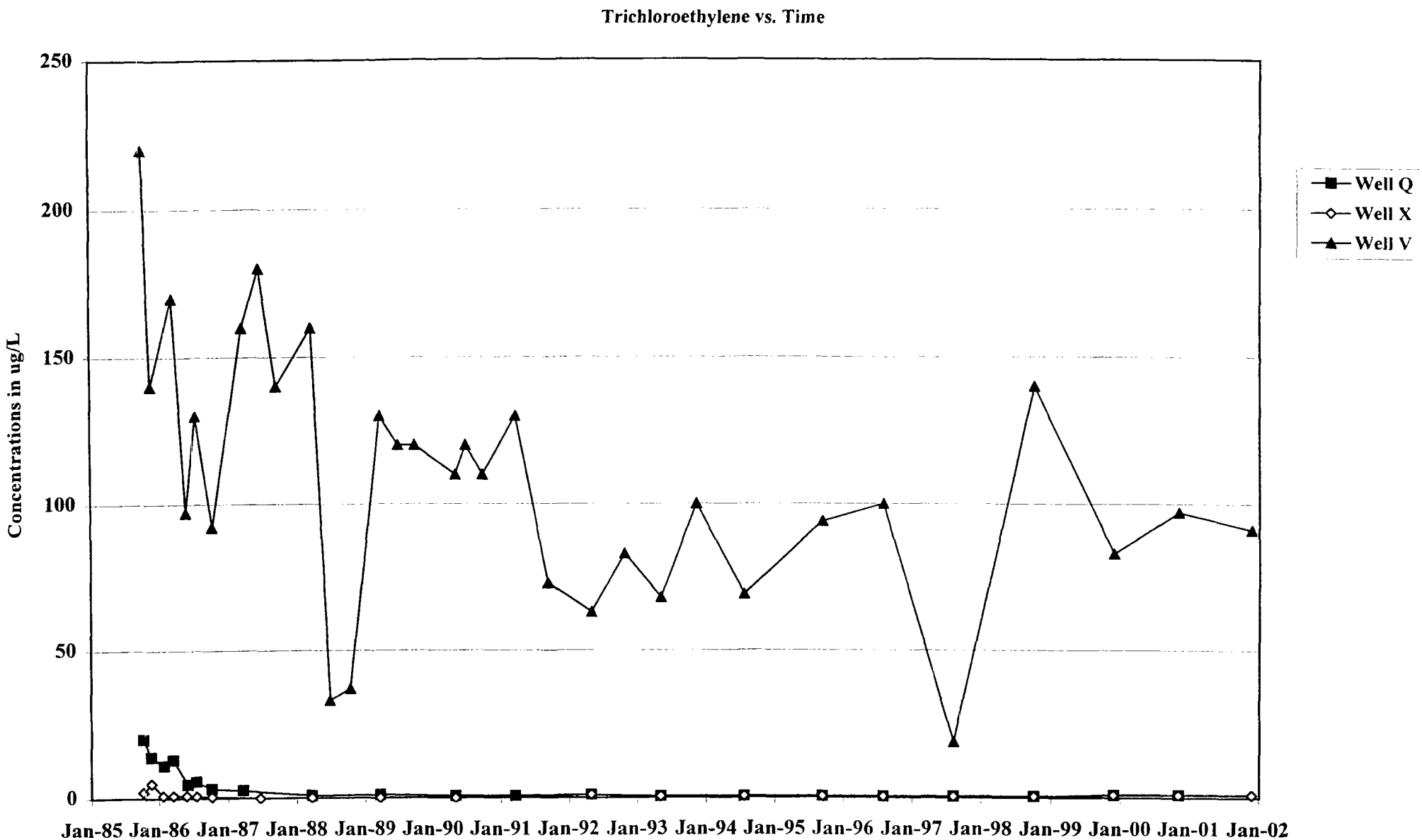
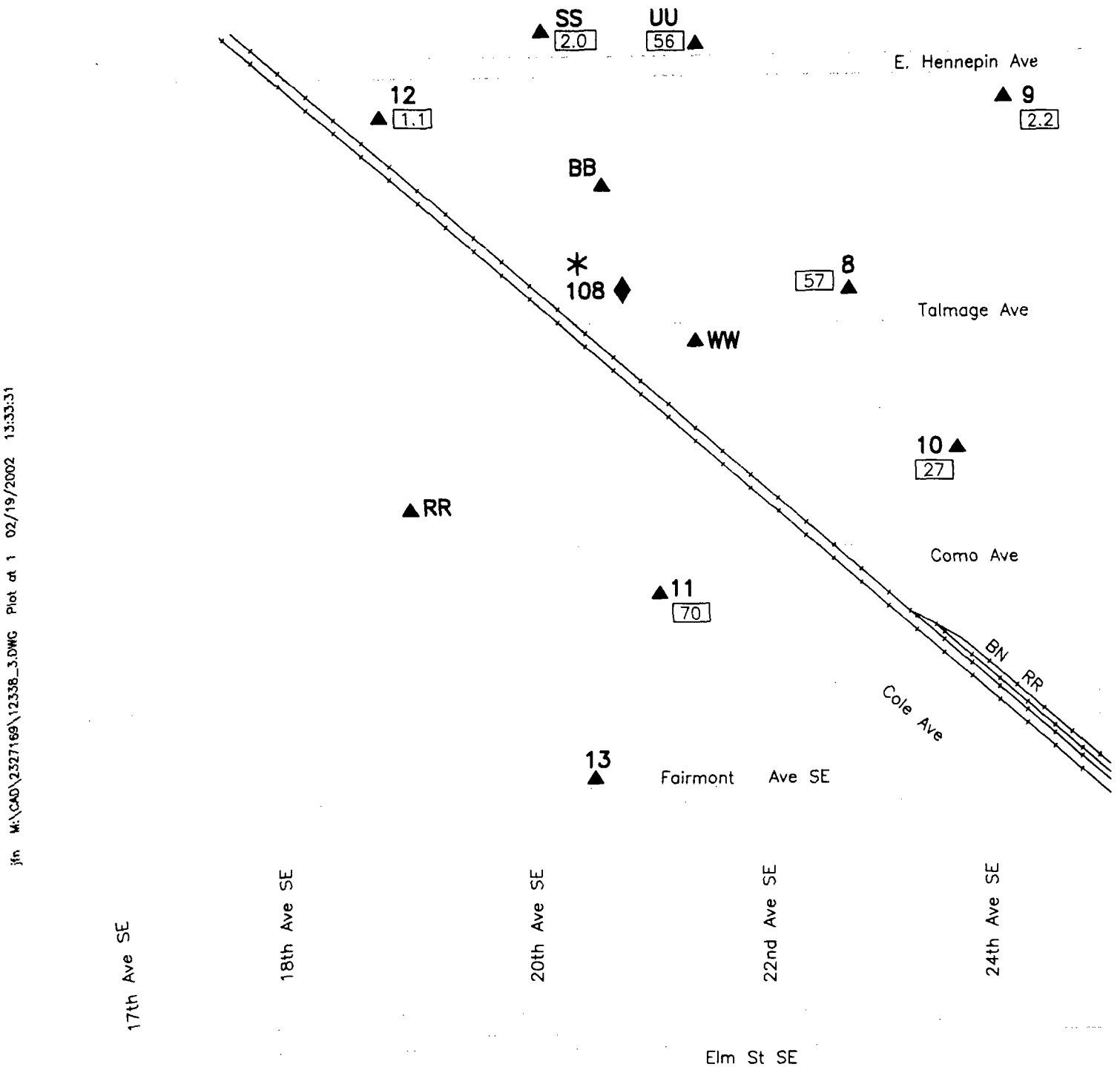


Figure 10
Glacial Drift Wells
TCE Concentrations
1985 - 2000

2/19/02
s:/dm/23/27/169/Gmtce,Chart1



▲ CARIMONA MEMBER MONITORING WELL

♦ FORMER CARIMONA MEMBER PUMP-OUT WELL

[57] TRICHLOROETHYLENE CONCENTRATION (TCE) (ug/L)

[ND] NOT DETECTED

✱ FORMER DISPOSAL SITE

N

0 400 800

SCALE IN FEET

Figure 11

CARIMONA MEMBER
GROUNDWATER QUALITY (TCE)
November 2001

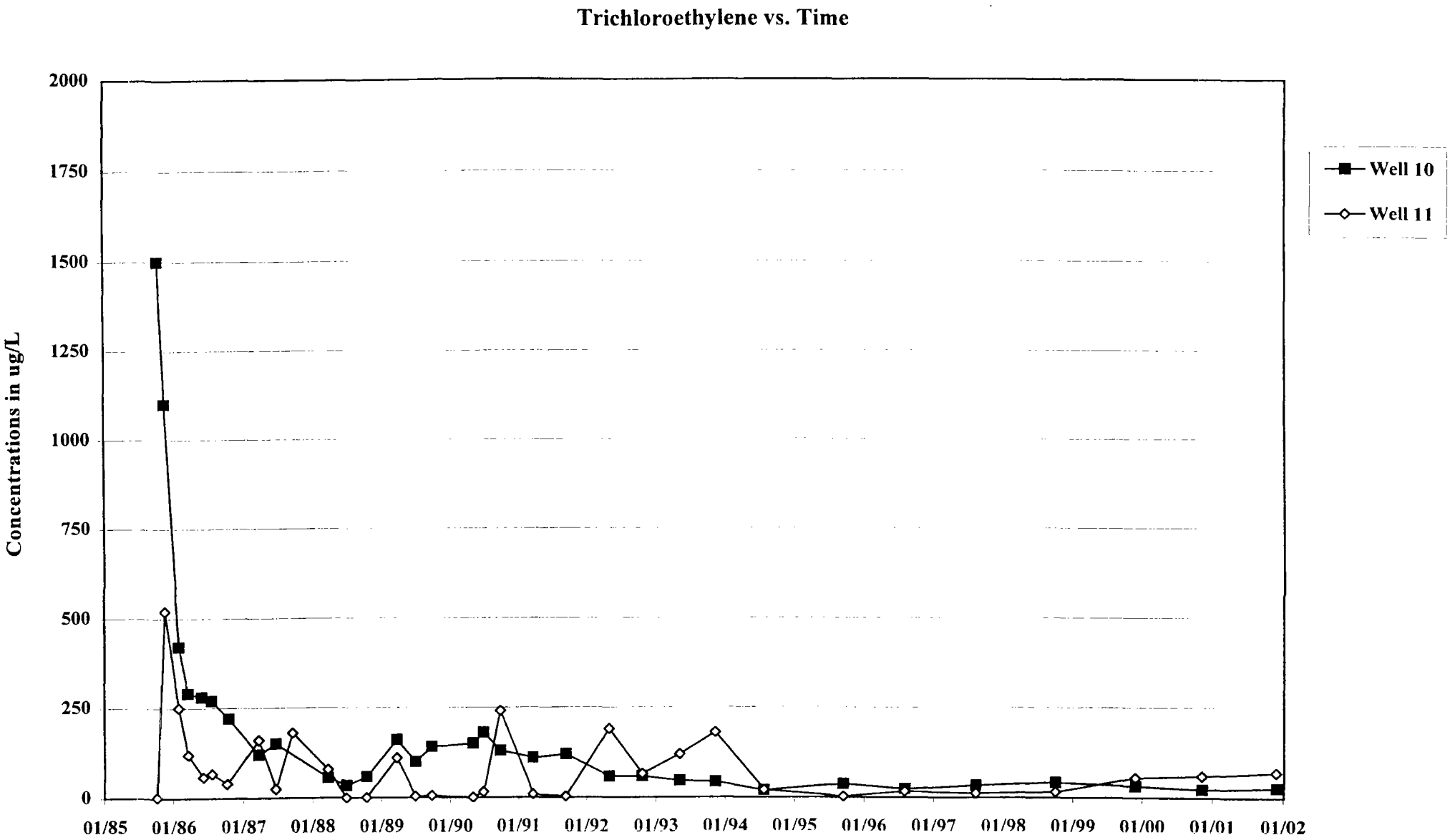
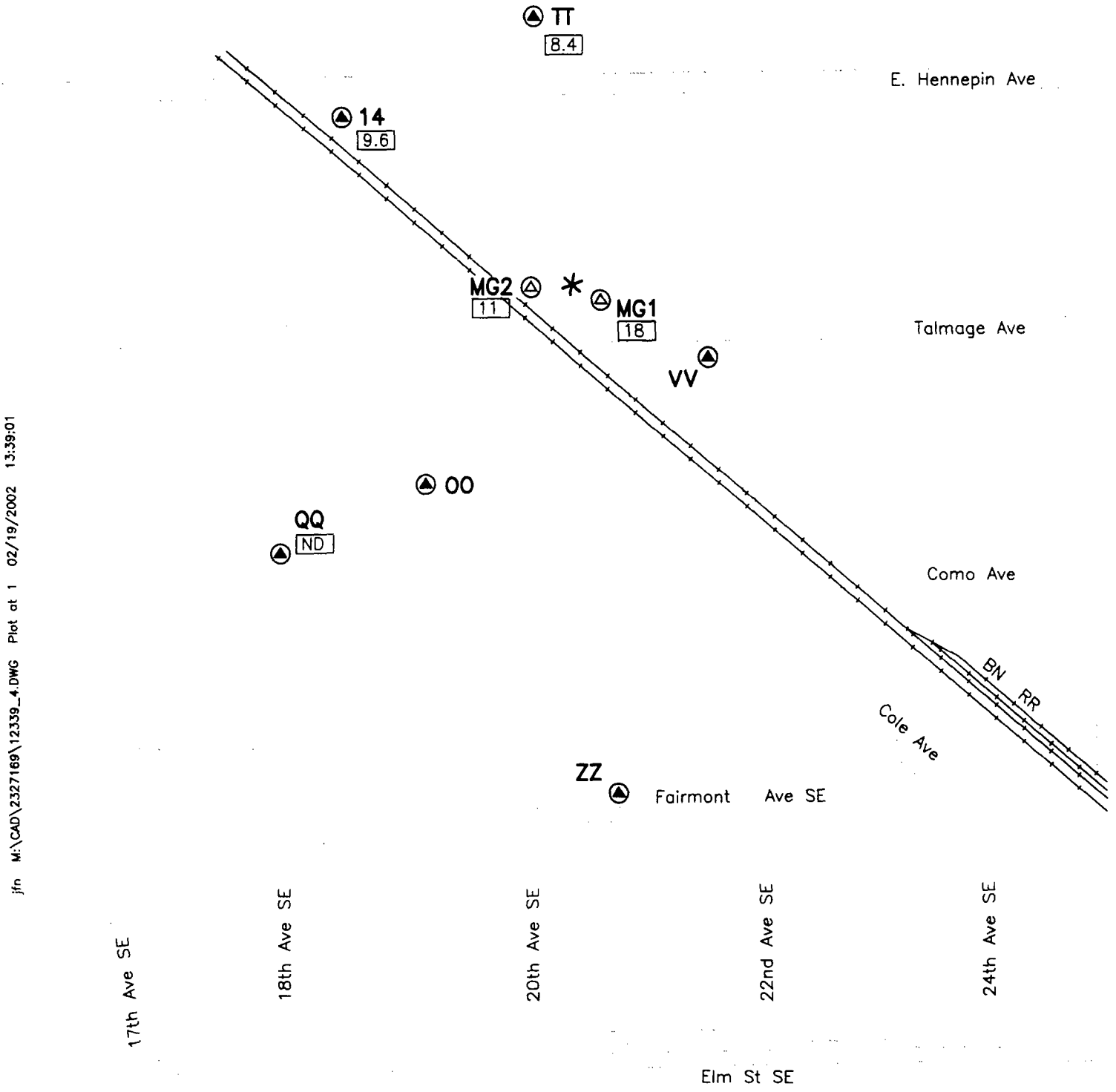


Figure 12
Carimona Member Wells
TCE Concentrations
1985 - 2001

2/19/02
s:/dm/23/27/165/Gmtce, Chart6



MAGNOLIA MEMBER MONITORING WELL

MAGNOLIA MEMBER PUMP-OUT WELL

8.4 TRICHLOROETHYLENE CONCENTRATION (TCE) (ug/L)

ND NOT DETECTED

* FORMER DISPOSAL SITE

N

0 400 800

SCALE IN FEET

Figure 13

MAGNOLIA MEMBER
GROUNDWATER QUALITY (TCE)
November 2001

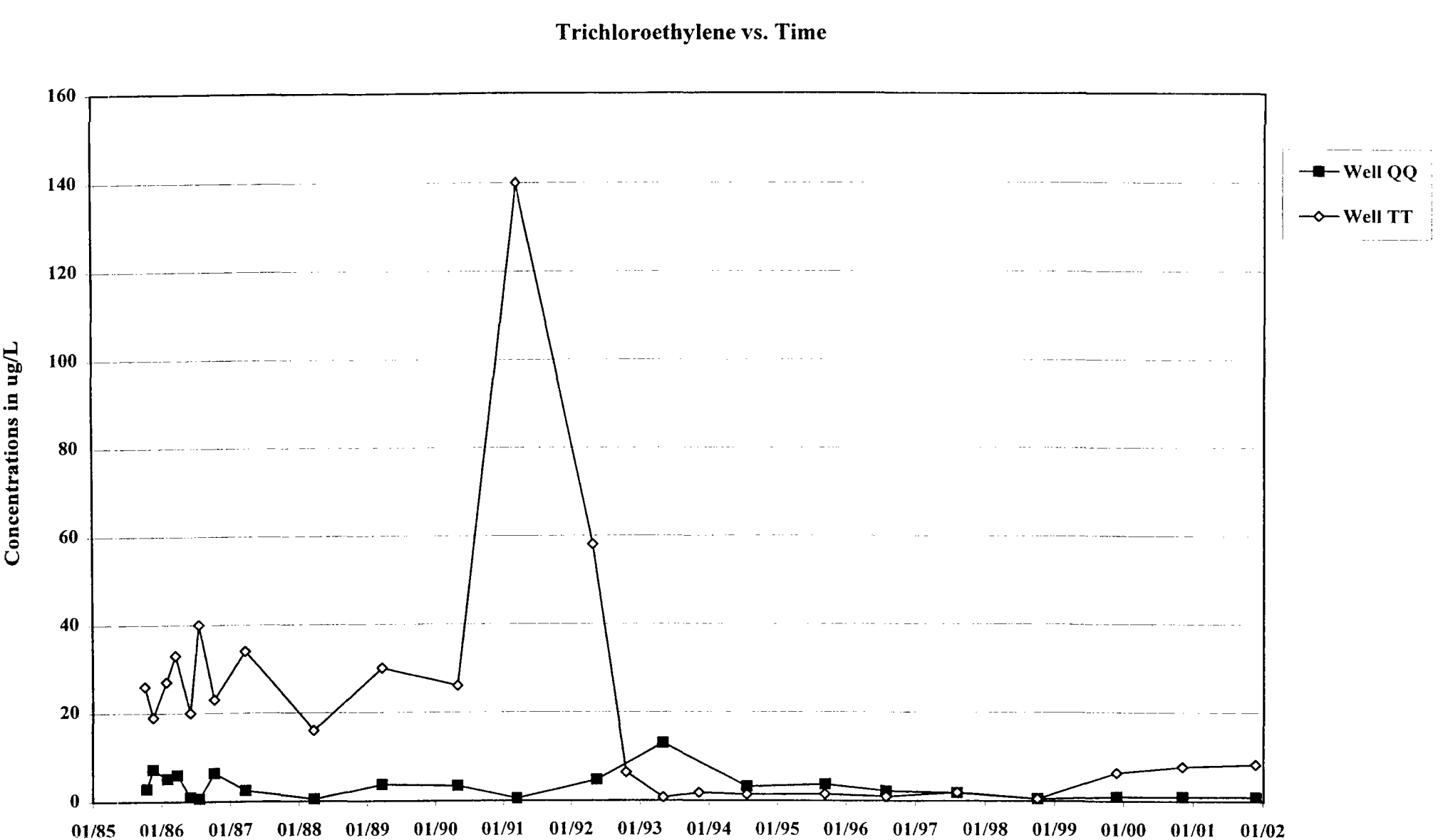
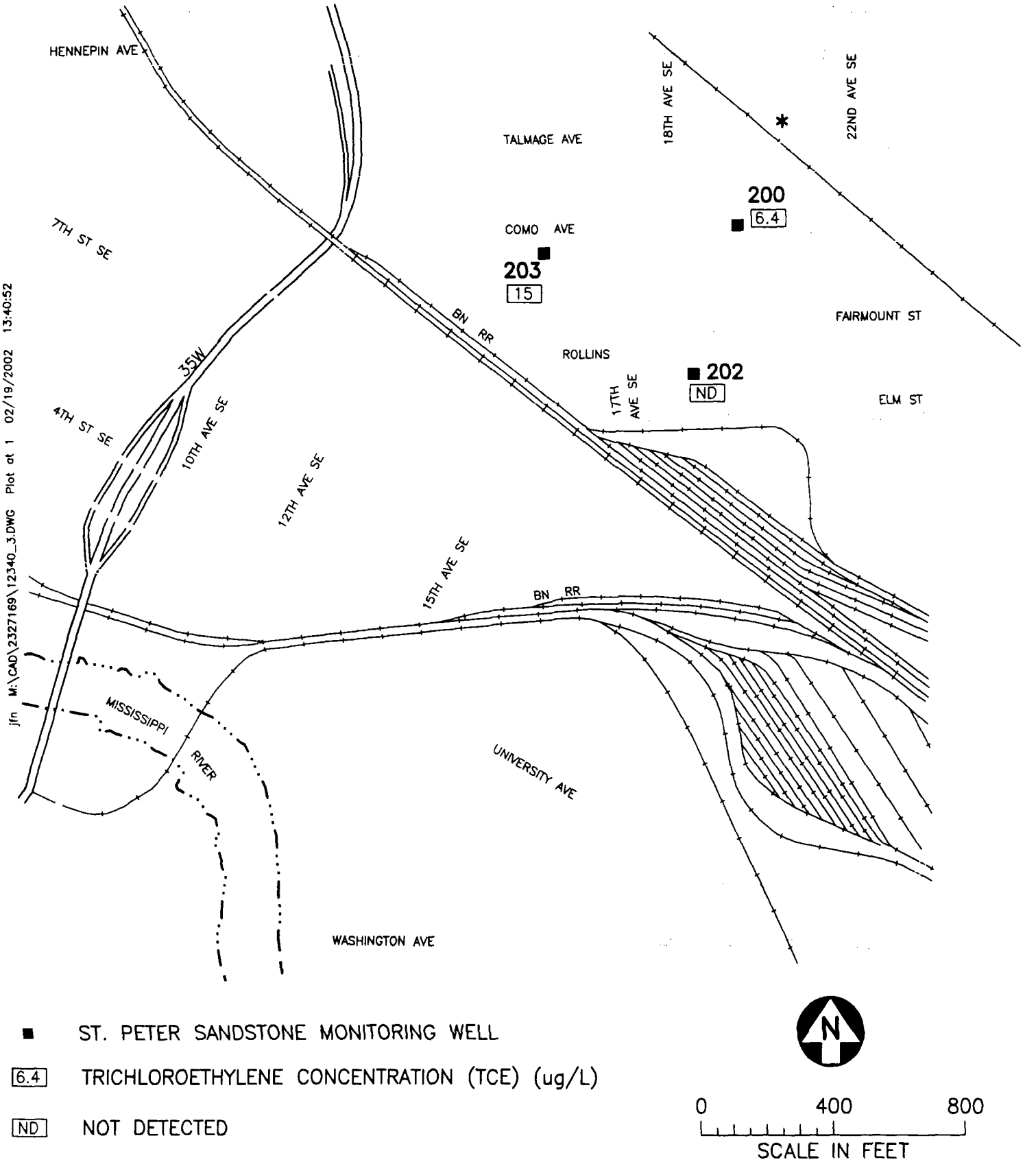


Figure 14
Magnolia Member Wells
TCE Concentrations
1985 - 2001

2/19/02
s:/dm/23/27/169/Gmtce,Chart2



■ ST. PETER SANDSTONE MONITORING WELL

6.4 TRICHLOROETHYLENE CONCENTRATION (TCE) (ug/L)

ND NOT DETECTED

* FORMER DISPOSAL SITE

Figure 15

ST PETER SANDSTONE
GROUNDWATER QUALITY (TCE)
November 2001

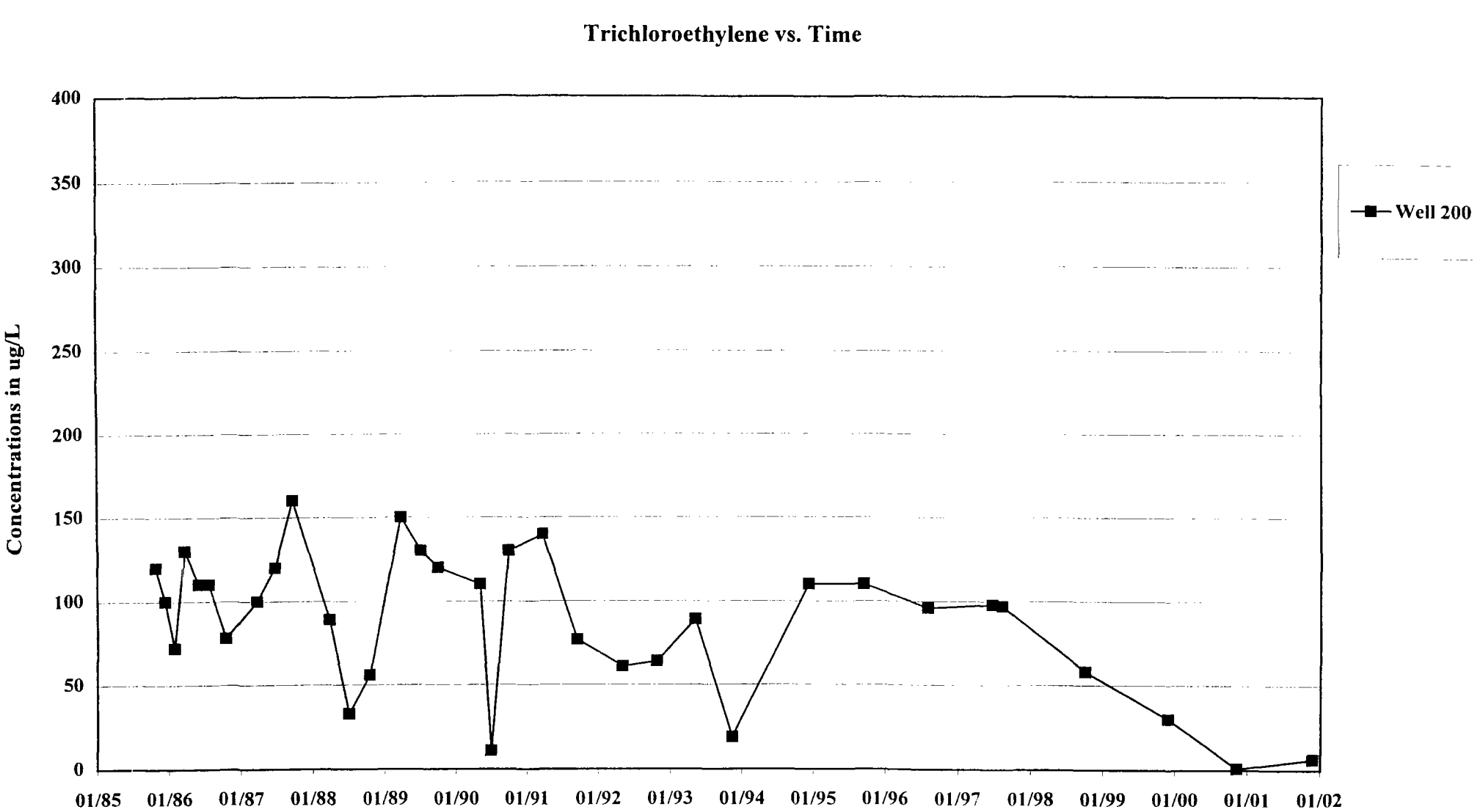


Figure 16
St. Peter Sandstone Wells
TCE Concentrations
1985 - 2001

2/19/02
s:/dm/23/27/169/Gmtce,Chart3

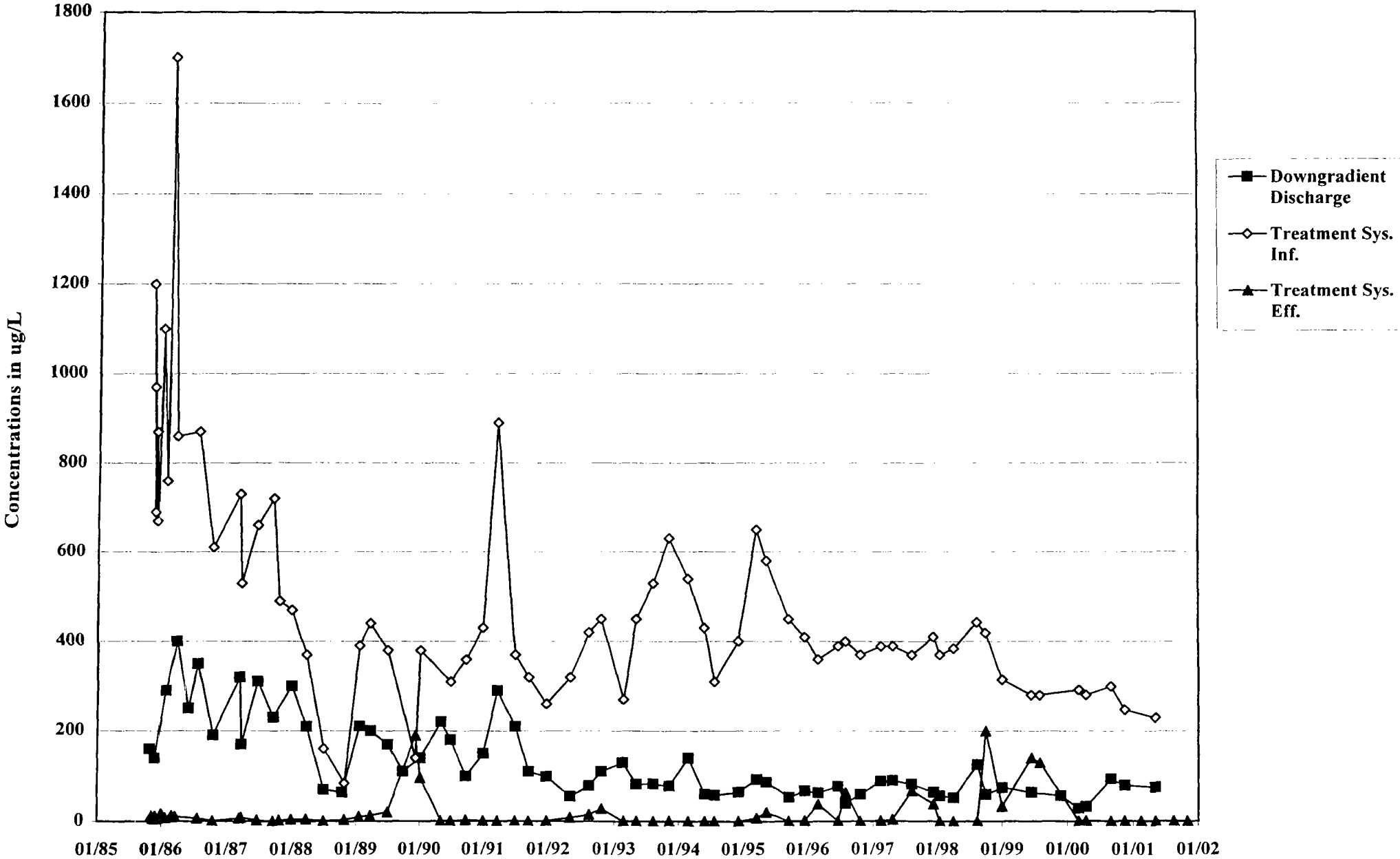


Figure 17
Trichloroethylene in Glacial Aquifer Pump-Out Systems

2/19/02
s:/dm/23/27/169/Gmtce,Chart4

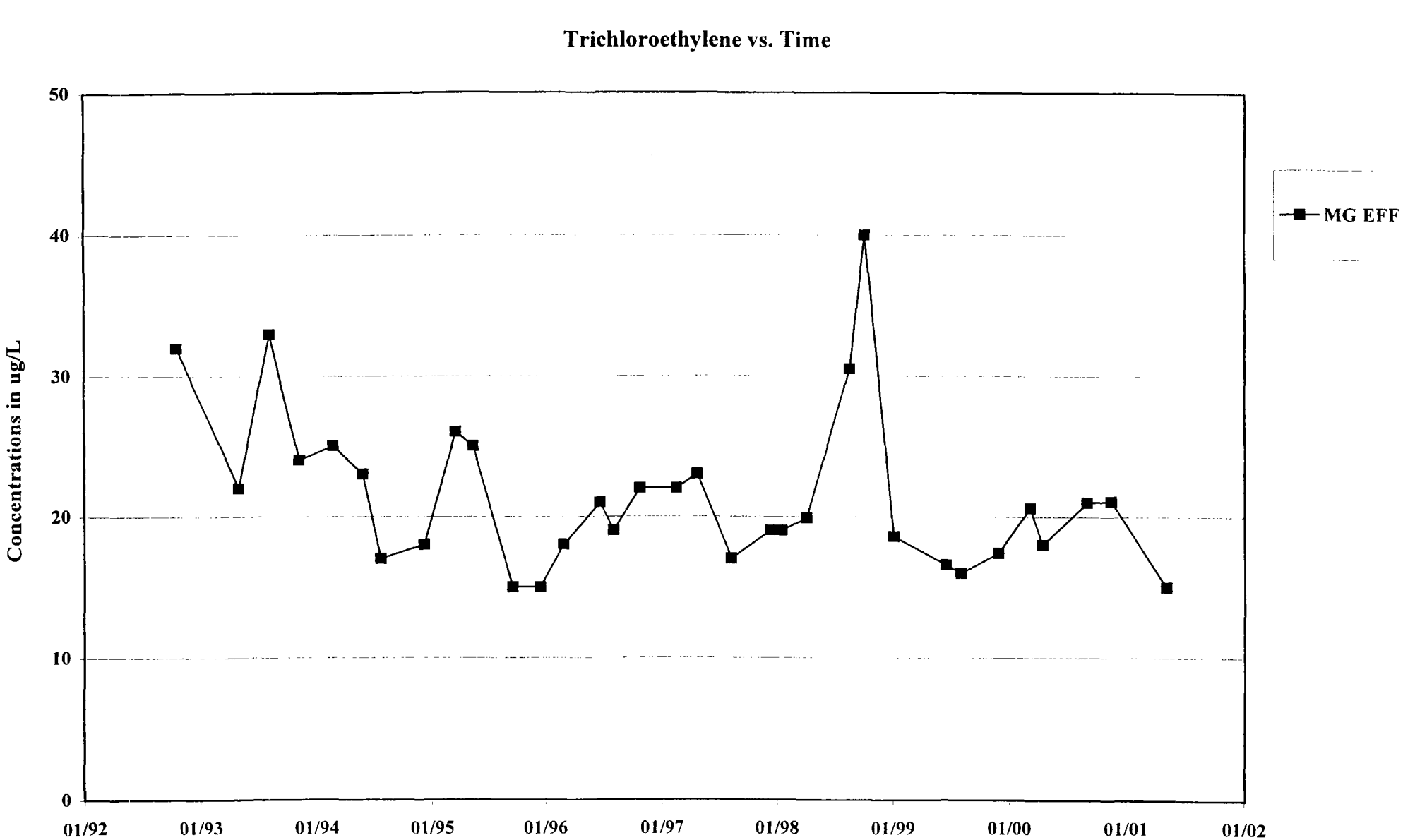
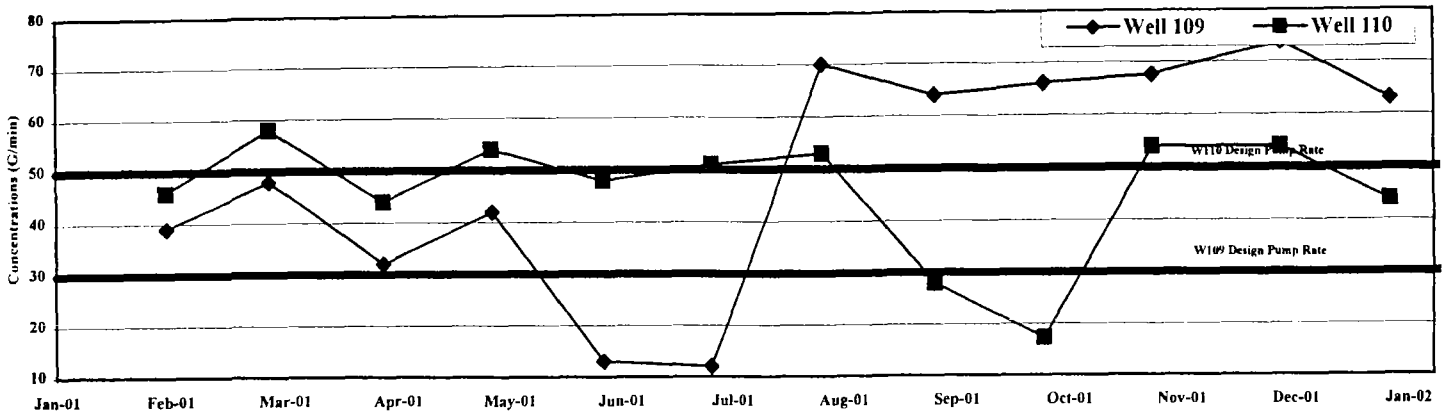
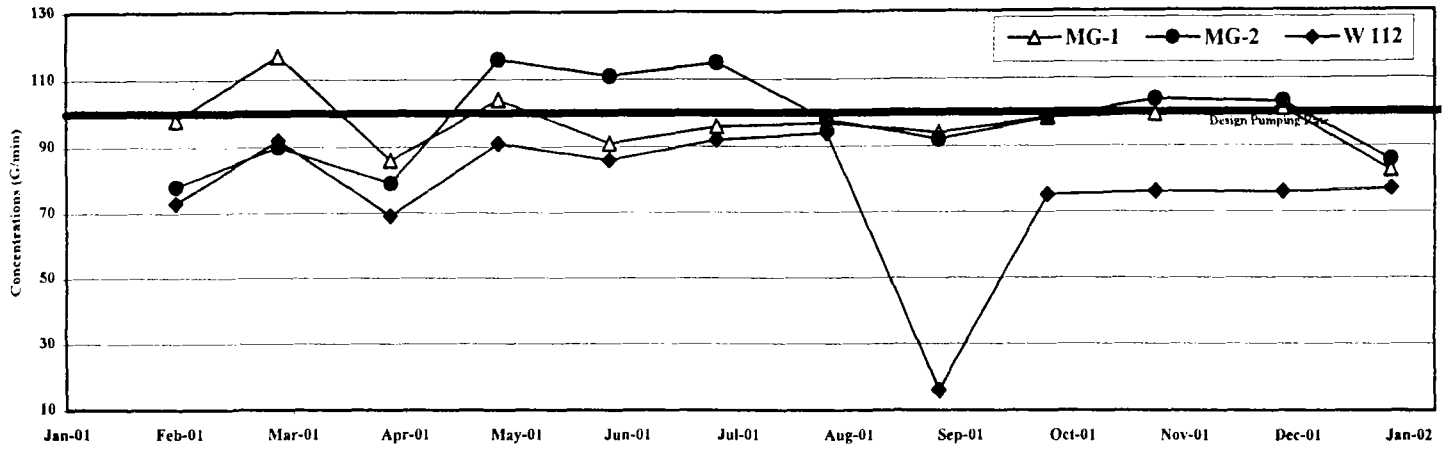


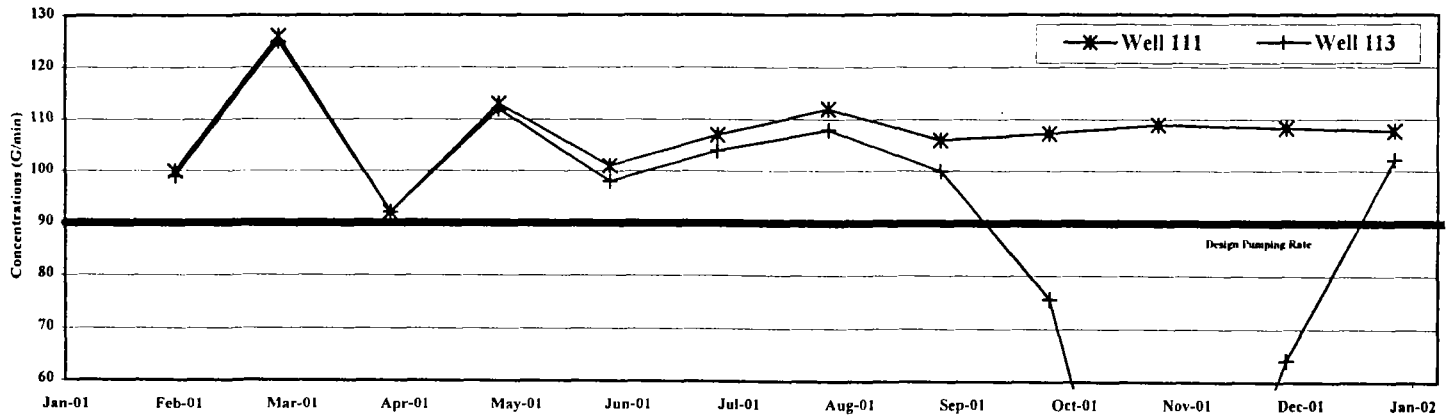
Figure 18
Magnolia Pump-Out Wells (MG1 and MG2)
TCE Concentrations
1992 - 2001

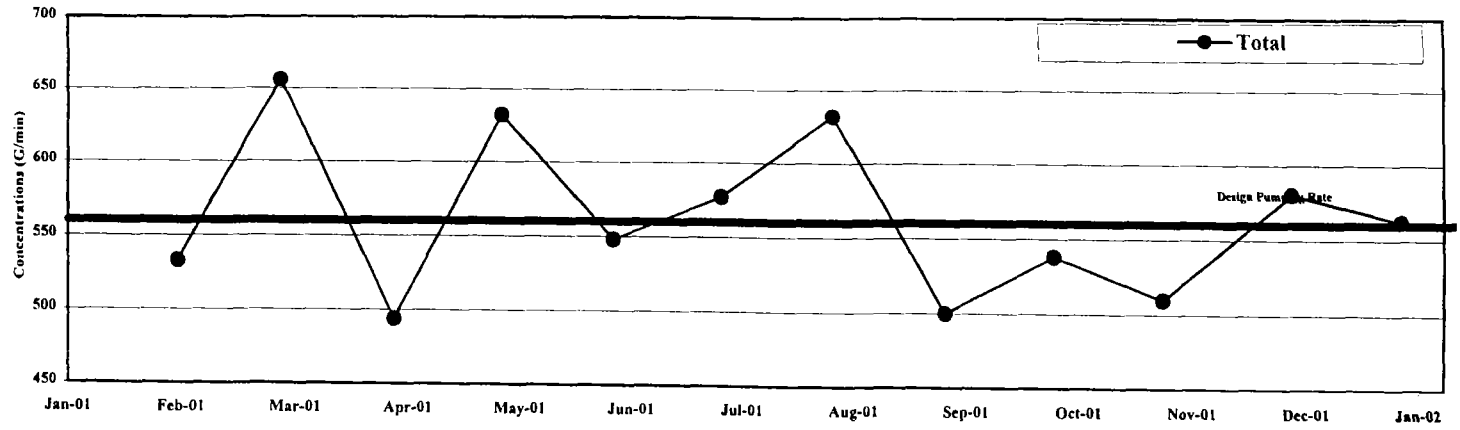
2/19/02
s:/dm/23/27/169/Gmtce,Chart5

General Mills Flow Data









2/19/02 2:16 PM
P:\23\27\169\103\Monthly\01\NEW WAY\NEW 2001 FLOWS.xls

Figure 19
2001 Pumping Rates Over Time

Appendices

Appendix A

East Hennepin Avenue Site
2000–2005 Operations and Monitoring Plan

The following monitoring plan governs the period January 1, 2000 to December 31, 2005. The plan is consistent with the terms of the Consent Order, and is suitable for a site with a status characterized as long-term operation and monitoring.

Intensive monitoring of the East Hennepin Avenue Site has occurred since February 1984. The results from this monitoring have defined the limits of groundwater contamination; have documented the effectiveness of the site groundwater pumpout systems; and have documented that site conditions in all affected aquifers have been stable since 1987.

The Consent Order specifies that the purpose of the groundwater monitoring program is to: monitor the effectiveness of the groundwater pumpout systems; define changes in the distribution of volatile hydrocarbon concentrations; and determine when operation of the system can be shut down.

The effectiveness of groundwater pumpout systems has been determined through aquifer pumping tests and groundwater modeling. The operational history (pumping rates and total gallons pumped) has been monitored since 1985. This time period includes both record wet and record dry years.

General Mills, Inc. has agreed to monitor the continued effectiveness of the pumpout systems through water quality monitoring and through operational monitoring. Water quality monitoring, including sample collection and analysis and water level measurement, will involve the annual collection of groundwater samples from down gradient Glacial Drift wells Q, T, V, W and X; Platteville wells 9, 10, 11, 12, 14, QQ, SS, TT and UU; St. Peter Well 200 and the Henkel Well. The samples will be analyzed on alternating years for trichloroethylene and List 2 volatile organic compounds (Table A-1). Well 8 will no longer be monitored because it is downgradient from wells 9 and 10 and is upgradient of wells SS and UU. Additionally, samples will be collected annually from St. Peter wells 202 and 203 and analyzed for TCE. Water levels will continue to be measured at Well 201 but no samples will be collected for analysis at this location.

Operational monitoring will involve the comparison of monthly mean pumping rates with historic pumping rates. If pumping rates fall below an action level (Table A-2), an assessment of the operational status of the well will be conducted and necessary repairs will be made.

Platteville Formation pumpout system operational monitoring will also include an annual 24-hour recovery test. This test will be conducted to determine if Magnolia member pumpout wells MG1 and MG2 are maintaining an adequate capture zone in the Platteville Formation. The recovery test will involve the measurement of water levels in wells RR, SS, VV, OO, TT and WW. Water levels will be measured prior to and 24 hours after an annual shutdown of pumpout wells MG1 and MG2. The data will be evaluated to determine if the Magnolia wells continue to generate similar drawdown as was observed during the 1992 pumping test.

NPDES monitoring will continue as specified in the permit. NPDES monitoring currently involves the collection of effluent water quality samples from each pumpout system and the stripper tower. ~~In addition to trichloroethylene and List 2 volatile organic compounds, priority pollutant volatile organic compounds and flow rate measurements are required on a routine basis.~~ Table A-1 lists the monitoring parameters required by the new May 11, 2000 NPDES permit.

Quarterly letter reports describing the results of operations, monitoring and maintenance will be prepared and submitted to the Minnesota Pollution Control Agency. The reports will contain tables summarizing operational and monitoring data. Laboratory data reports will be attached to the report. Any data which indicates a long-term change in the operational status or effectiveness of the pumpout systems will be discussed in detail. A description of any action taken in response to this information will also be documented.

Table A-1

Monitoring Parameters
(Modified in 2001)

Monitoring Wells Even Years	Monitoring Wells Odd Years (List 2)	NPDES Stations
Water evels and field data	Water Levels and field data	Flows
		pH
Trichloroethylene	1,1-Dichloroethane	1,1-Dichloroethane
	1,2-Dichloroethane	1,2-Dichloroethane
	1,2-Dichloroethene, cis	1,2-Dichloroethene, cis
	1,2-Dichloroethene, trans	1,2-Dichloroethene, trans
	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
	Tetrachloroethylene	Tetrachloroethylene
	1,1,1-Trichloroethane	1,1,1-Trichloroethane
	Trichloroethylene	Trichloroethylene
	Vinyl Chloride	
	Benzene	Benzene
	Ethylbenzene(1)	Ethylbenzene(1)
	Toluene	Toluene
	Xylenes	Xylenes

(1) Added in 2001 at request of MPCA

Table A-2

Pumpout System Operation Guidelines
Pumping Rates

Pumpout Well Identification	Target Pumping Rate (Average Monthly gpm)	Action Level (Average Monthly gpm)
Well 109	30	20
Well 110	50	40
Well 111	90	80
Well 112	100	80
Well 113	90	80
Well MG1	100	80
Well MG2	100	80

If action levels are not met, an assessment of the operational status of the pumpout well will be undertaken and any necessary repairs will be made.

FIELD SAMPLING REPORT

Date: December 11, 2001

Project: General Mills

Contact: Bill Bangsund
Barr Engineering Company
4700 W. 77th Street
Minneapolis, MN 55435-4803

Field Sampling

Annual groundwater monitoring at the General Mills site was conducted on December 4, 5, 6, 7, and 10, 2001. The Platteville Formation pumpout system recovery test was completed on December 5 and 6, 2001.

Field Report

Attachments:

- Field log cover sheet
- Water level summary
- Field log data summary
- Pumpout system recovery test
- Field log data sheets
- Meter calibration summary
- Chain-of-custodies #15358 and 15360

Laboratory Analysis Status

Samples were sent to Trimatrix, Grand Rapids, Michigan, for analysis. Refer to the chain of custodies and parameter table for specific laboratory analyses.

Kim Johannessen
Water Quality

::ODMA\PCDOCS\DOCS\230496\1

FIELD LOG COVER SHEET
WATER SAMPLING

Client: General Mills

Project No.: 23/27-169 Y01 102

Field Staff: KSJ, SDI

Sampling Period: December 4, 5, 6, 7, and 10, 2001

Summary of Field Activities

- Water levels were measured on December 4, 2001.
- Blind duplicate sample M-1 was collected at well 8. A field blank was also collected near well 8.
- The 24-hour recovery test was performed on December 5 and 6, 2001.
- Fourth quarter pumpout system well-specific samples were collected on November 15, 2001.

::ODMA\PCDOCS\DOCS\230496\1

WATER LEVEL SUMMARY

Project: GENERAL MILLS

Project Number: 23/27-169YO2

Date: 12-4-01

Field Staff: KSJ

Monitoring Location	Measuring point elevation	Water level depth	Total well depth	Static water elevation	Comments
109	857.97	29.70		828.27	TOC
110	852.35			--	
111	846.94	28.91		818.03	
112	841.37	28.54		812.83	
113	841.26	22.75		818.51	
Q	850.38	21.81	25.5	828.57	
T	849.36	16.86	24.0	832.50	
V	838.59	21.15	27.5	817.44	
W	830.78	13.25	19.0	817.53	
X	842.90	20.05	21.0	822.85	
8	860.36	30.46	64.0	829.90	
9	862.48	32.38	63.0	830.10	
10	860.39	30.29	64.0	830.10	
11	852.84	22.89	54.0	829.95	
12	861.10	32.32	63.0	828.78	
RR	849.97	19.93	50.5	830.04	
SS	861.70	38.38	60.5	823.32	
UU	863.98	34.06	63.0	829.92	
WW	857.76	27.82	60.5	829.94	
OO	850.07	30.27	60.5	819.80	
QQ	849.01	29.08	59.5	819.93	
TT	861.94	45.06	70.0	816.88	
VV	859.09	36.86	70.5	822.23	
200	851.14	85.04	198.0	766.10	
MG-1	860.81	53.82		806.99	TOC
MG-2	859.82	50.22		809.60	TOC
201	885.09	104.25	144.0	780.84	
203	850.05	95.97	118.0	754.08	measured on 12-6-01
202	843.45	88.73	116.0	754.72	
14	858.53	42.07	68.5	816.46	

WATER LEVEL SUMMARY

Project: GENERAL MILLS

Project Number: 23/27-169TMF102

Field Staff: KSJ

Date: 12-4-01

Monitoring Location	Measuring point elevation	Water level depth	Total well depth	Static water elevation	Comments
109	857.97	29.70		--	TOC
110	852.35			--	
111	846.94	28.91		--	
112	841.37	28.54		--	
113	841.26	22.75		--	
Q	850.38	21.81	25.5	--	
T	849.36	16.86	24.0	--	
V	838.59	21.15	27.5	--	New lock
W	830.78	13.25	19.0	--	
X	842.90	20.05	21.0	--	
8	860.36	30.46	64.0	--	
9	862.48	32.38	63.0	--	
10	860.39	30.29	64.0	--	
11	852.84	22.89	54.0	--	New lock
12	861.10	32.32	63.0	--	
RR	849.97	19.93	50.5	--	Missing flush cover/ no cap/no lock - 5¼" = 0.0 4" = 1.1
SS	861.70	38.38	60.5	--	
UU	863.98	34.06	63.0	--	#13 = 19.58
WW	857.76	27.82	60.5	--	
OO	850.07	30.27	60.5	--	New lock
QQ	849.01	29.08	59.5	--	
TT	861.94	45.06	70.0	--	
VV	859.09	36.86	70.5	--	
200	851.14	85.04	198.0	--	
MG-1	860.81	53.82		--	TOC
MG-2	859.82	50.22		--	TOC
201	885.09	104.25	144.0	--	
203	850.05	95.97	118.0	--	12-6-01
202	843.45	88.73	116.0	--	
14	858.53	42.07	68.5	--	
S		20.84			
R		dry			
5		20.73			- Missing lock - replaced

FIELD DATA SUMMARY

Project: GENERAL MILLS

Project number: 23/27-169

Field Staff: KSJ

Monitoring location	Date	Temp (oC)	Conductivity @ 25 oC	pH	Eh (mV)	Dissolved Oxygen (mg/L)
11	12-5-01	11.6	994	6.91	-45	0.10
SS	"	13.0	1017	7.01	-88	0.08
TT	"	12.7	1197	6.93	12	0.07
UU	"	11.3	1308	6.94	-6	0.67
Q	"	13.5	1327	6.84	57	2.54
14	"	11.9	1227	7.02	-54	0.06
12	"	11.4	429	9.06	-172	0.07
T	12-6-01	13.7	901	6.97	91	2.46
X	"	13.2	1681	6.87	-50	
V	"	12.3	1379	6.90	65	4.56
W	"	13.5	1259	6.95	47	2.95
QQ	"	10.3	503	7.57	-93	
200	12-7-01	10.7	485	7.27	-121	1.19
Henkel	"	10.7	366	7.71	-115	4.14
202	12-10-01	11.5	456	7.35	150	2.25
203	"	12.0	448	7.05	12	2.89
8	"	12.1	960	6.87	-141	0.81
9	"	12.5	953	6.87	-148	0.15
10	"	11.5	1061	6.94	7	0

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: 11
Location:	Date: 12-5-01
Project #: 23/27-169 Y01 102	Sample time: 0950

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	4"	Volume	oC	@ 25				Appearance
Total well depth:*	54	0916/61g.	11.6	998	6.94	-54	0.15	clear
Static water level:*	22.89	0929/81g.	11.6	996	6.92	-47	.12	clear
Water depth:*	31.1	0943/102g.	11.6	994	6.91	-45	.10	clear
Well volume: (gal)	20.3							
Purge method:	1.5" submer.							
Sample method:	bailer							
Start time:	0835	Odor: none detected						
Stop time:	0943	Purge Appearance: begin - slightly cloudy yellow/end - clear						
Duration: (minutes	68	Sample Appearance: clear						
Rate, gpm:	1.5	Comments:						
Volume purged:	102 g.							
Duplicate collected?	-							
Sample collection by: KSJ		CO2- Mn2- Fe (T)- Fe2-						
Others present:		Well condition: GOOD						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: SS
Location:	Date: 12-5-01
Project #: 23/27-169 Y01 102	Sample time: 1115

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2"	Volume	oC	@ 25				Appearance
Total well depth:*	60.5	1044/11g.	13.0	1011	7.04	-83	.11	clear
Static water level:*	38.38	1057/15g.	13.0	1013	7.04	-85	.09	clear
Water depth:*	22.1	1110/19g.	13.0	1017	7.01	-88	.08	clear
Well volume: (gal)	4							
Purge method:	1.5" subm.							
Sample method:	bailer							
Start time:	1007	Odor: none detected						
Stop time:	1110	Purge Appearance: clear						
Duration: (minutes	63	Sample Appearance: clear						
Rate, gpm:	3.3	Comments:						
Volume purged:	1110							
Duplicate collected?	-							
Sample collection by: KSJ		CO2- Mn2- Fe (T)- Fe2-						
Others present:		Well condition: GOOD						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: TT
Location:	Date: 12-5-01
Project # : 23/27-169 401102	Sample time: 1207

GENERAL DATA		STABILIZATION TEST						
Barr lock:		Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2"	Volume	oC	@ 25				Appearance
Total well depth:*	70	1143/12g.	12.7	1176	7.00	-17	.11	clear
Static water level:*	45.06	1153/16g.	12.7	1185	6.97	-6	.09	clear
Water depth:*	25	1203/20g.	12.7	1197	6.93	+12	.07	clear
Well volume: (gal)	4							
Purge method:	1.5" subm.							
Sample method:	bailer							
Start time:	1113	Odor: none detected						
Stop time:	1203	Purge Appearance: clear						
Duration: (minutes	50	Sample Appearance: clear						
Rate, gpm:	.8.4	Comments:						
Volume purged:	20 gal							
Duplicate collected?	-							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			
Others present:		Well condition:						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: UU
Location:	Date: 12-5-01
Project #: 23/27-169 Y01 102	Sample time: 1314

GENERAL DATA		STABILIZATION TEST						
Barr lock:	Yes	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2	Volume	oC	@ 25				Appearance
Total well depth:*	63'	1237/14g.	11.4	1276	6.94	3.1	0.57	clear
Static water level:*	34.06	1258/19g.	11.3	1297	6.94	-9	0.76	clear
Water depth:*	29	1307/24g.	11.3	1308	6.94	-6	0.67	clear
Well volume: (gal)	4.7							
Purge method:	1.5" Subm.							
Sample method:	bailer							
Start time:	1219	Odor: none detected						
Stop time:	1307	Purge Appearance: clear						
Duration: (minutes	48	Sample Appearance: clear						
Rate, gpm:	.5	Comments:						
Volume purged:	24 gal							
Duplicate collected?	—							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			
Others present:		Well condition: GOOD						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: Q
Location:	Date: 12-5-01
Project #: 23/27-169 Y01 102	Sample time: 1351

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2	Volume	oC	@ 25				Appearance
Total well depth:*	25.5	1336/2g.	13.4	1320	6.91	35.6	2.49	clear
Static water level:*	21.81	1341/3g.	13.5	1329	6.87	52.1	2.63	clear
Water depth:*	3.7	1346/4g.	13.5	1327	6.84	56.9	2.54	clear
Well volume: (gal)	.6							
Purge method:	1.5" subm.							
Sample method:	bailer							

Start time: 1326	Odor: none detected
Stop time: 1346	Purge Appearance: begin - cloudy brown/clear @ .8 gal
Duration: (minutes) 20	Sample Appearance: clear
Rate, gpm: .2	Comments:
Volume purged: 4 gal	
Duplicate collected? –	
Sample collection by: KSJ	CO2- Mn2- Fe (T)- Fe2-
Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: 14
Location:	Date: 12-5-01
Project #: 23/27.169 Y01 102	Sample time: 1529

GENERAL DATA

Barr lock:	Yes
Casing diameter:	2
Total well depth:*	68.5
Static water level:*	42.07
Water depth:*	26.4
Well volume: (gal)	4.3
Purge method:	1.5" subm.
Sample method:	bailer
Start time:	1409
Stop time:	1524
Duration: (minutes	75
Rate, gpm:	.4
Volume purged:	30 gal
Duplicate collected?	—
Sample collection by:	KSJ

STABILIZATION TEST

Time/ Volume	Temp. oC	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
1441/13g.	12.0	954	8.01	-230	.28	clear
1451/17g.	12.0	1012	7.57	-181	.19	clear
1504/22g.	11.9	1183	7.20	-143	.13	clear
1514/26g.	11.9	1202	7.09	-101	.09	clear
1524/30g.	11.9	1227	7.02	-54	.06	clear

Odor: none detected

Purge Appearance: clear

Sample Appearance: clear

Comments:

CO2- Mn2- Fe (T)- Fe2-

Others present:

Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: 12
Location:	Date: 12-5-01
Project # : 23/27-169 401 102	Sample time: 1747

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	4	Volume	oC	@ 25				Appearance
Total well depth:*	63	1602/5 gal	9.9	429	9.06	-125	0.30	clear
Static water level:*	32.32	1627/10 gal	10.3	429	9.06	-134	.18	clear
Water depth:*	30.7	1652/15 gal	10.5	430	9.06	-147	.16	clear
Well volume: (gal)	20.1	1712/20 gal	10.6	428	9.06	-155	.13	clear
Purge method:	1.5" Subm.	1742/25 gal	11.4	429	9.06	-172	07	clear
Sample method:	bailer							
Start time:	1537	Odor:						
Stop time:	1742	Purge Appearance: clear						
Duration: (minutes)	125	Sample Appearance:						
Rate, gpm:	.2	Comments:						
Volume purged:	25 gal							
Duplicate collected?								
Sample collection by: KSJ		CO2- Mn2- Fe (T)- Fe2-						

Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: T
Location:	Date: 12-6-01
Project # : 23/27-169 Y01102	Sample time: 0938

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2	Volume	oC	@ 25				Appearance
Total well depth:*	24	0916/3.5g	13.5	928	7.09	188	1.57	clear
Static water level:*	16.86	0922/4.7g	13.7	916	7.02	130	2.46	clear
Water depth:*	7	0928/6g	13.7	906	6.99	98		clear
Well volume: (gal)	1.2	0933/7g	13.7	901	6.97	91		clear
Purge method:	Peristaltic							
Sample method:	Peristaltic							
Start time:	0858	Odor: None detected						
Stop time:	0933	Purge Appearance: clear						
Duration: (minutes	35	Sample Appearance: clear						
Rate, gpm:	.2	Comments:						
Volume purged:	7 gal							
Duplicate collected?	—							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			
Others present:		Well condition: GOOD						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: X
Location:	Date: 12-6-01
Project # : 23/27-169 Y01 102	Sample time: 1035

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2	Volume	oC	@ 25				Appearance
Total well depth:*	21.0	.6g.	12.5	1764	6.79	-105	-	cloudy
Static water level:*	20.05	.8g.	12.9	1709	6.83	-87	-	clear
Water depth:*	1	1g.	13.2	1681	6.87	-50	-	clear
Well volume: (gal)	.2							
Purge method:	Peristaltic							
Sample method:	Peristaltic							
Start time:	0957	Odor: none detected						
Stop time:	1027	Purge Appearance: begin - cloudy brown / end - clear						
Duration: (minutes	30	Sample Appearance: clear						
Rate, gpm:	<.1	Comments:						
Volume purged:	1 gal							
Duplicate collected?	-							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			
Others present:		Well condition: GOOD						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: V
Location:	Date: 12-6-01
Project #: 23/27-169 Y01 102	Sample time: 1155

GENERAL DATA

Barr lock:	YES
Casing diameter:	2" PVC
Total well depth:*	27.5
Static water level:*	21.15
Water depth:*	6.4
Well volume: (gal)	1
Purge method:	Peristaltic
Sample method:	Peristaltic
Start time:	1057
Stop time:	1147
Duration: (minutes	50
Rate, gpm:	.1
Volume purged:	5 gal
Duplicate collected?	—
Sample collection by:	KSJ

STABILIZATION TEST

Time/ Volume	Temp. oC	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
1127/3g.	12.4	1376	6.91	35	5.53	clear
1137/4g.	12.4	1377	6.91	57	4.91	clear
1147/5g.	12.3	1379	6.90	65	4.56	clear

Odor: none detected

Purge Appearance: begin - cloudy brown / end - clear

Sample Appearance: clear

Comments:

CO2- Mn2- Fe (T)- Fe2-

Others present:

Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: W
Location:	Date: 12-6-01
Project #: 23/27-169 Y01102	Sample time: 1318

GENERAL DATA		STABILIZATION TEST						
Barr lock:	Yes	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	2"	Volume	oC	@ 25				Appearance
Total well depth:*	19.0	1243/3g.	13.4	1180	7.10	-32	3.60	clear
Static water level:*	13.25	1253/4g.	13.5	1238	7.02	14	3.40	clear
Water depth:*	5.8	1303/5g	13.5	1247	6.98	32	3.19	clear
Well volume: (gal)	.9	1313/6g.	13.5	1259	6.95	47	2.95	clear
Purge method:	Peristaltic							
Sample method:	Peristaltic							
Start time:	1213	Odor: none detected						
Stop time:	1313	Purge Appearance: clear						
Duration: (minutes	60	Sample Appearance: clear						
Rate, gpm:	.1	Comments:						
Volume purged:	6 gal							
Duplicate collected?	-							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			
Others present:		Well condition: good						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: QQ
Location:	Date: 12-6-01
Project # : 23/27-169 Y01 102	Sample time: 1548

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	1.25"	Volume	oC	@ 25				Appearance
Total well depth:*	59.5	1438/6.5g.	10.1	427	7.70	7.1	—	clear
Static water level:*	29.08	/9g.	10.3	497	7.58	-79	-	clear
Water depth:*	30.4	11g.	10.3	495	7.59	-85	-	clear
Well volume: (gal)	2.2	1543/13g.	10.3	503	7.57	-93	-	clear
Purge method:	Peristaltic							
Sample method:	Peristaltic							
Start time:	1333	Odor: none detected						
Stop time:	1543	Purge Appearance: clear						
Duration: (minutes	130	Sample Appearance: clear						
Rate, gpm:	.1	Comments:						
Volume purged:	13gal							
Duplicate collected?	—							
Sample collection by: KSJ		CO2- Mn2- Fe (T)- Fe2-						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: 200
Location:	Date: 12-7-01
Project #: 23/27-169 Y01 102	Sample time: 1315

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:	8"	Volume	oC	@ 25				Appearance
Total well depth:*	198	1215/882gal	10.4	507	7.47	-138	1.95	clear
Static water level:*	85.04	1230/1176g.	10.6	492	7.33	-129	1.26	clear
Water depth:*	113	1250/1470g.	10.7	488	7.29	-124	1.44	clear
Well volume: (gal)	294	1310/1764g.	10.7	485	7.27	-121	1.19	clear
Purge method:	Dedicated							
Sample method:	Grab							
Start time:	1112	Odor: none detected						
Stop time:	1310	Purge Appearance: clear						
Duration: (minutes	118	Sample Appearance: clear						
Rate, gpm:	15	Comments:						
Volume purged:	1764 gal							
Duplicate collected?	—							
Sample collection by:	KSJ	CO2-	Mn2-	Fe (T)-	Fe2-			

Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	Monitoring Point: Henkel
Location:	Date: 12-7-01
Project #: 23/27-1694 01 102	Sample time: 14/15

GENERAL DATA		STABILIZATION TEST						
Barr lock:	–	Time/	Temp.	Cond.	pH	Eh	D.O.	Turbidity
Casing diameter:		Volume	oC	@ 25				Appearance
Total well depth:*		14/20	10.7	366	7.71	-115	4.14	slightly cloudy brown
Static water level:*								
Water depth:*								
Well volume: (gal)								
Purge method:	Dedicated							
Sample method:	Grab							
Start time:	1345	Odor: slight						
Stop time:	1405	Purge Appearance: slightly brown						
Duration: (minutes	20	Sample Appearance: slightly brown						
Rate, gpm:	~ 20	Comments: Drained holding tank, ran pump 20 minutes before collecting samples.						
Volume purged:	400 gal.							
Duplicate collected?	–							
Sample collection by: KSJ		CO2- Mn2- Fe (T)- Fe2-						

Others present:	Well condition: Good

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	**Monitoring Point:** 202
Location:	**Date:** 12-10-01
Project #: 23/27-169401 102	**Sample Time:** 1135

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES							
Casing diameter:	4	Time/ Volume	Temp. °C	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
Total well depth:*	116	1022/54g.	12.1	481	7.18	130	3.72	cloudy brown
Static water level:*	88.73	1040/72g.	11.9	473	7.24	139	2.89	clearing
Water depth:*	27.3	1058/90g.	11.7	465	7.29	143	2.57	clearing
Well volume: (gal)	18	1116/108g	11.6	459	7.33	147	2.38	clear
Purge method:	Dedicated	1134/126g	11.5	456	7.35	150	2.25	clear
Sample method:	Grab							
Start time:	0928	Odor: none detected						
Stop time:	1134	Purge Appearance: begin - cloudy brown						
Duration: (minutes)	126	Sample Appearance: slightly cloudy						
Rate, gpm:	1	Comments: 10-15 minute delay after starting generator before water started flowing. Silty cloudy brown in appearance - ≤ 1 gpm initial clearing @ ≈ 65 gallons						
Volume, purged:	126 gal							
Duplicate collected?	—							
Sample collection by:	KSJ	CO2- Mn2- Fe(T)- Fe2-						

Others present:

WELL INSPECTION (answer for each category, state if lock replaced, detail any repairs needed on back of form)

CASING & CAP: ✓ COLLAR: ✓ LOCK: ✓ OTHER:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	General Mills	**Monitoring Point:**	203
Location:		**Date:**	12-10-11
Project #:	23/27-169 Y01102	**Sample Time:**	1240

GENERAL DATA		STABILIZATION TEST						
Barr lock:		Time/ Volume	Temp. °C	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
Casing diameter:	4							
Total well depth:*	118.0	1217/43g.	11.9	446	7.20	-29	3.06	clear
Static water level:*	95.97	1222/58g.	12.0	445	7.13	-24	2.97	clear
Water depth:*	22	1229/72g.	12.0	447	7.09	+7	2.94	clear
Well volume: (gal)	14.4	1237/86g.	12.0	448	7.05	12	2.89	clear
Purge method:	Dedicated							
Sample method:	grab							
Start time:	1153	Odor: none detected						
Stop time:	1237	Purge Appearance: clear						
Duration: (minutes)	43	Sample Appearance: clear						
Rate, gpm:	4 2	Comments:						
Volume, purged:	86 gal							
Duplicate collected?	-							
Sample collection by:	KSJ	CO2-	Mn2-	Fe(T)-	Fe2-			

Others present:

WELL INSPECTION (answer for each category, state if lock replaced, detail any repairs needed on back of form)

CASING & CAP: ✓ COLLAR: ✓ LOCK: ✓ OTHER:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	**Monitoring Point:** 8
Location:	**Date:** 12-10-01
Project #: 23/27-169401102	**Sample Time:** 1340

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES							
Casing diameter:	4	Time/ Volume	Temp. °C	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
Total well depth:*	64	1314/66 gal	12.0	980	7.07	-114	1.81	slightly cloudy brown
Static water level:*	30.46	1319/88 g.	12.1	971	7.00	-123	1.11	clear
Water depth:*	33.5	1325/110 g.	12.1	967	6.93	-132	.93	clear
Well volume: (gal)	22	1330/132 g	12.1	963	6.89	-137	.87	clear
Purge method:	Dedicated	1336/154 g	12.1	960	6.87	-141	.81	clear
Sample method:	Grab							
Start time:	1257	Odor: none detected						
Stop time:	1336	Purge Appearance: begin - cloudy brown/end - clear						
Duration: (minutes)	339	Sample Appearance: clear						
Rate, gpm:	4	Comments:						
Volume, purged:	154 gal							
Duplicate collected?	M-1							
Sample collection by:	KSJ	CO2-	Mn2-	Fe(T)-	Fe2-			

Others present:

WELL INSPECTION (answer for each category, state if lock replaced, detail any repairs needed on back of form)

CASING & CAP: ✓ COLLAR: ✓ LOCK: ✓ OTHER:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 4 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	**Monitoring Point:** 9
Location:	**Date:** 12-10-01
Project #: 23/27-169401 10 2	**Sample Time:** 14/30

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES							
Casing diameter:	4	Time/ Volume	Temp. °C	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
Total well depth:*	63.0	1416/60s.	12.6	950	6.93	-138	.37	clear
Static water level:*	32.38	1421/80g.	12.5	952	6.90	-143	.21	clear
Water depth:*	30.6	1425/100g.	12.5	953	6.87	-148	.15	clear
Well volume: (gal)	20							
Purge method:	Dedicated							
Sample method:	Grab							
Start time:	1401	Odor: None detected						
Stop time:	1426	Purge Appearance: clear						
Duration: (minutes)	25	Sample Appearance: clear						
Rate, gpm:	4	Comments:						
Volume, purged:	100 gal							
Duplicate collected?	–							
Sample collection by:	KSJ	CO2-	Mn2-	Fe(T)-	Fe2-			

Others present:

WELL INSPECTION (answer for each category, state if lock replaced, detail any repairs needed on back of form)

CASING & CAP: ✓ COLLAR: ✓ LOCK: ✓ OTHER:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: General Mills	**Monitoring Point:** 10
Location:	**Date:** 12-10-01
Project #: 23/27-169 Y01102	**Sample Time:** 1525

GENERAL DATA		STABILIZATION TEST						
Barr lock:	YES							
Casing diameter:	4	Time/ Volume	Temp. °C	Cond. @ 25	pH	Eh	D.O.	Turbidity Appearance
Total well depth:*	69	1500/75g.	11.5	1043	7.12	-48	.86	clear
Static water level:*	30.29	1506/100g.	11.5	1060	7.03	-11	.57	clear
Water depth:*	38.7	1513/125g.	11.5	1067	6.97	-1	.54	clear
Well volume: (gal)	25	1520/150g.	11.5	1061	6.94	7	.45	clear
Purge method:	Dedicated							
Sample method:	Grab							
Start time:	1441	Odor: none detected						
Stop time:	1520	Purge Appearance: clear						
Duration: (minutes)	38	Sample Appearance: clear						
Rate, gpm:	4	Comments:						
Volume, purged:	150 gal							
Duplicate collected?	—							
Sample collection by:	KSJ	CO2-	Mn2-	Fe(T)-	Fe2-			

Others present:

WELL INSPECTION (answer for each category, state if lock replaced, detail any repairs needed on back of form)

CASING & CAP: ✓ COLLAR: ✓ LOCK: ✓ OTHER:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 2 semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

BARR ENGINEERING COMPANY
METER CALIBRATION SUMMARY

PROJECT General Mills

TECHNICIAN KSJ

Meter type and number	Date	Time	Temperature C	Standard Used	Meter Reading	Slope	Conductivity Redline
YSI 556	12-5-01	0820	19.3	7/10	7.00/10.00	–	–
	12-6-01	0843	15.7	7/10	7.00/10.00	–	–
	12-7-01	1042	13.1	7/10	7.00/10.00	–	–
	12-10-01	0913	15.1	7/10	7.00/10.00	–	–
Conductivity Cell Check	Date	Solution Used	Cell Result				
	12-5-01	1000 umhos	1000 umhos				
	12-6-01	1000 umhos	1000 umhos				
ORP Probe Check	Date	Temp.	ORP Reading	Calculation Result			
	12-5-01	–	231				
231+,- 10mV @ 25C	12-6-01	–	231				
231mV = Display Value + [(Display Temp. - 25 C) x (1.3 mV)]							

WEATHER CONDITIONS

Date	Wind Direction	Wind Speed	Temperature F	Cloud Cover	Comments
12-5-01	N	5-20 mph	50-58	overcast	rain, drizzle
12-6-01	NW	5-10 mph	30-38	overcast	
12-7-01	WSW	5-15 mph	35-40	clear	
12-10-01	WNW	0-10 mph	25-35	clear	

Comments:

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(612) 832-2600

Project Number: 23127-169 Y01 902

N. 13443

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative: Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (NaOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Zn Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)		(HCL)/DRO, 1L Glass	Lugols, Amber glass	Formalin, Glass					Total No. Of Containers	Remarks/ Analysis Required:
1. MW-1	11-15-01		✓			✓				2																				2	LIST 2 VOC's
2. MW-2			✓			✓				2																				2	
3. W109			✓			✓				2																				2	
4. W110			✓			✓				2																				2	
5. EFF			✓			✓				2																				2	
6. W111 (MW-1)			✓			✓				2																				2	
7. W112			✓			✓				2																				2	
8. W113			✓			✓				2																				2	
9. MW-1			✓			✓		✓		2																				2	
10. FB-1			✓					✓		2																				2	
11.																															
12.																															
13.																															
14.																															
15.																															
16.																															

Project Manager: WJP

Project Contract: WDS

Laboratory: TRI-MATRIX

Remarks/ Analysis Required:

Sampled By: Kim Hammesser

Remarks:

Relinquished By: Kim Hammesser — Date: 11-15-01 — Time:

Relinquished By: — Date: — Time:

Received by: — Date: — Time:

Received by: — Date: — Time:

Samples Shipped VIA: ☐Air Freight ☒Fed. Exp. ☐Sampler ☐Other

Air Bill Number: 821204786729

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

Project Number: 23/27-169.401.102

15360

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative: Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (NaOH,Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Zn Acetate)	Dioxin	Whirlpak	Total Phenol (H_2SO_4)	Methane	(HCL)/DRO, 1L Glass	Lugols, Glass, Amber	Formalin, Glass					Total No. Of Containers
1. 202 12-1001			✓			✓				2																				2
2. 203			✓			✓				2																				2
3. 8 (M-1)			✓			✓				2																				2
4. 9			✓			✓				2																				2
5. 10			✓			✓				2																				2
6. M-1			✓			✓		✓		2																				2
7. FB-1			✓					✓		2																				2
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Project Manager: WJB

Project Contact: WDS

Laboratory: TRI-MATRIX

Remarks/ Analysis Required: LIST 2 VOA's

Sampled By: Kim Johannessen

Remarks:

Relinquished By: [signature] — Date: 12-10-01 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by: — Date: — Time:

Received by: — Date: — Time:

Air Bill Number: 821204286930

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Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Rev. 08/01/01

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

Project Number: 23/27-169 Y01 102

15358

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (NaOH,Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Zn Acetate)	Dioxin	Whirlpak	Total Phenol (H_2SO_4)	Methane	(HCL)/DRO, 1L Glass	Lugols, Glass, Amber	Formalin, Glass					Total No. Of Containers
1. 11	12-5-01		✓			✓				2																				2
2. SS			✓			✓				2																				2
3. TT			✓			✓				2																				2
4. UU			✓			✓				2																				2
5. Q			✓			✓				2																				2
6. 14			✓			✓				2																				2
7. 12			✓			✓				2																				2
8. T	12-6-01		✓			✓				2																				2
9. X			✓			✓				2																				2
10. V			✓			✓				2																				2
11. W			✓			✓				2																				2
12. QQ			✓			✓				2																				2
13. 200	12-7-01		✓			✓				2																				2
14. Henkel			✓			✓				2																				2
15. TB-1			✓					✓		1																				1
16.																														

Number of Containers/Preservative

Project Manager: WJB

Project Contact: WDS

Laboratory: TRI-MATRIX

Remarks/ Analysis Required: 4/57 2 VOC's

Sampled By: Kim Johannesser

Remarks:

Relinquished By: Kim Johannesser — Date: 12-10-01 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by: — Date: — Time:

Received by: — Date: — Time:

Air Bill Number: 621204869 30

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Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Rev. 08/01/01

FIELD DATA SUMMARY

Project: GENERAL MILLS

Project number: 23/27-169Y01102

Field Staff: Kim Johannessen

Monitoring location	Date	Temp (oC)	Conductivity @ 25 oC	pH	Eh (mV)
109	11-15-01	12.8	1458	7.19	44
110	"	13.1	1521	7.02	75
MG-1	"	12.1	1112	7.22	30
MG-2	"	12.6	1046	7.32	174
EFF	"	13.8	1492	7.99	84
111	"	13.9	1422	7.12	178
112	"	13.1	1623	6.88	173
113	"	12.9	1689	6.84	171

BARR ENGINEERING COMPANY
METER CALIBRATION SUMMARY

PROJECT General Mills

TECHNICIAN KSJ

Meter type and number	Date	Time	Temperature C	Standard Used	Meter Reading	Slope	Conductivity Redline
YSI	11-15-01	1205	18.3	7/10	7.00/10.00		
Conductivity	Date	Solution Used	Cell Result				
Cell Check	11-15-01	1000 umhos	1007 umhos				
ORP Probe	Date	Temp.	ORP Reading	Calculation Result			
Check	11-15-01	18.5	237	229			
231+,- 10mV @ 25C							
231mV = Display Value + [(Display Temp. - 25 C) x (1.3 mV)]							

WEATHER CONDITIONS

Date	Wind Direction	Wind Speed	Temperature F	Cloud Cover	Comments
11-15-01	SSE	5-10 mph	60-65	70%	

Comments:

FIELD DATA SUMMARY

Project: GENERAL MILLS

Project number: 23/27-169Y01102

Field Staff: Kim Johannessen

Monitoring location	Date	Temp (oC)	Conductivity @ 25 oC	pH	Eh (mV)
109	8-30-01	13.1	1607	6.95	28
MG-1	"	12.7	1212	6.95	14
MG-2	"	13.2	1146	6.80	78
EFF	"	13.5	1220	7.80	35
W111	"	16.2	1633	6.75	80
W113	"	14.4	1791	6.70	87

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(612) 832-2600

Project Number: 23627-169 2.1 002 102

12081

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH,Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	(HCL)/DRO, 1L Glass	Lugols, Glass, Amber	Formalin, Glass					Total No. Of Containers
1. W109	8.30.01		✓			✓				2																			2
2. MG-1										2																			2
3. MG-2										2																			2
4. ~~EFF~~										2																			2
5. W111 (MD)										2																			2
6. W113										2																			2
7. M-1						✓		✓		2																			2
8. FB-1								✓		2																			2
9. TB-1			✓					✓		1																			1
10.																													
11.																													
12.																													
13.																													
14.																													
15.																													
16.																													

Number of Containers/Preservative

Project Manager: WJB

Project Contact: WOS

Laboratory: TRI-MATRIX

Remarks/ Analysis Required: LIST 2 VOC's

Sampled By: Kim Johannessen

Remarks:

Relinquished By:	Date	Time	Received by:	Date	Time
Kim Johannessen	8.30.01				
Relinquished By:	Date	Time	Received by:	Date	Time
			Air Bill Number:		

Samples Shipped VIA ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Distribution: White Original Accompanies Shipment to Lab; Yellow Field Copy; Pink Lab Coordinator

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Appendix C
Quality Assurance/Quality Control

List of Tables

Table C-1
2001 Blank Sample Data
(concentrations in ug/L)

Location Date	Field Blank 2/28/01	Field Blank 5/18/01	Field Blank 8/30/01	Field Blank 11/15/01	Field Blank 12/10/01	Trip Blank 2/28/01	Trip Blank 5/18/01	Trip Blank 5/21/01	Trip Blank 8/30/01	Trip Blank 12/7/01
1,1,1-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	--	--	--	--	--	--	--	<1.0	--	--
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	--	--	--	--	--	--	--	<1.0	--	--
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene, cis	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene, trans	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	--	--	--	--	--	--	--	<1.0	--	--
1,3-Dichloro-1-propene trans	--	--	--	--	--	--	--	<1.0	--	--
1,3-Dichloro-1-propene, cis	--	--	--	--	--	--	--	<1.0	--	--
2-Hexanone	--	--	--	--	--	--	--	<50	--	--
Acetone	--	--	--	--	--	--	--	<50	--	--
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	--	--	--	--	--	--	--	<1.0	--	--
Bromoform	--	--	--	--	--	--	--	<1.0	--	--
Bromomethane	--	--	--	--	--	--	--	<1.0	--	--
Carbon disulfide	--	--	--	--	--	--	--	<5.0	--	--
Carbon tetrachloride	--	--	--	--	--	--	--	<1.0	--	--
Chlorobenzene	--	--	--	--	--	--	--	<1.0	--	--
Chlorodibromomethane	--	--	--	--	--	--	--	<1.0	--	--
Chloroethane	--	--	--	--	--	--	--	<1.0	--	--
Chloroform	--	--	--	--	--	--	--	<1.0	--	--
Chloromethane	--	--	--	--	--	--	--	<1.0	--	--
Ethyl benzene	--	--	--	<1.0	<1.0	--	--	<1.0	--	<1.0
Methyl ethyl ketone	--	--	--	--	--	--	--	<50	--	--
Methyl isobutyl ketone	--	--	--	--	--	--	--	<50	--	--
Methylene chloride	--	--	--	--	--	--	--	<5.0	--	--
Styrene	--	--	--	--	--	--	--	<1.0	--	--
Tetrachloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

-- Not analyzed.

Table C-1
2001 Blank Sample Data
(concentrations in ug/L)

Location Date	Lab Blank 2/28/01	Lab Blank 2/28/01	Lab Blank 2/28/01	Lab Blank 5/18/01	Lab Blank 5/18/01	Lab Blank 5/18/01	Lab Blank 5/21/01	Lab Blank 8/30/01	Lab Blank 11/15/01	Lab Blank 11/15/01	Lab Blank 11/15/01	Lab Blank 11/15/01	Lab Blank 11/15/01	Lab Blank 12/5/01	Lab Blank 12/5/01
1,1,1-Trichloroethane	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	--	<1.0	<1.0
1,1,2-Trichloroethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0
1,1-Dichloroethylene	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
1,2-Dichloroethane	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	<1.0	<1.0	<1.0	--	--	--	<1.0	<1.0
1,2-Dichloroethylene, cis	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0
1,2-Dichloroethylene, trans	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0
1,2-Dichloropropane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
1,3-Dichloro-1-propene trans	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
1,3-Dichloro-1-propene, cis	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
2-Hexanone	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	--
Acetone	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	--
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	--	<1.0	<1.0
Bromodichloromethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Bromoform	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Bromomethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Carbon disulfide	--	--	--	--	--	--	<5.0	--	--	--	--	--	--	--	--
Carbon tetrachloride	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Chlorobenzene	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Chlorodibromomethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Chloroethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Chloroform	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Chloromethane	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Ethyl benzene	--	--	--	--	--	--	<1.0	--	<1.0	--	--	--	--	<1.0	<1.0
Methyl ethyl ketone	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	--
Methylene chloride	--	--	--	--	--	--	<5.0	--	--	--	--	--	--	--	--
Styrene	--	--	--	--	--	--	<1.0	--	--	--	--	--	--	--	--
Tetrachloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0
Trichloroethylene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0
Xylenes total	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	--	--	--	<3.0	<3.0

-- Not analyzed.

Table C-2
2001 Blind Duplicate Data
(concentrations in ug/L)

Location	MG2	MG2	RPD	MGEFF	MGEFF	RPD	111	111	RPD	111	111	RPD	8	8	RPD
Date	2/28/01	2/28/01	2/28/01	5/18/01	5/18/01	5/18/01	8/30/01	8/30/01	8/30/01	11/15/01	11/15/01	11/15/01	12/10/01	12/10/01	12/10/01
Lab	TriMatrix	TriMatrix		TriMatrix	TriMatrix		TriMatrix	TriMatrix		TriMatrix	TriMatrix		TriMatrix	TriMatrix	
Dup		DUP			DUP			DUP			DUP			DUP	
1,1-Dichloroethane	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
1,2-Dichloroethylene, cis	1.9	4.3	77	2.2	2.3	4.4	<1.0	<1.0		<1.0	<1.0		15	14	6.9
1,2-Dichloroethylene, trans	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
1,2-Dichloroethane	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
Benzene	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		6.5	6.7	3
Ethyl benzene	--	--		--	--		--	--		<1.0	<1.0		<1.0	<1.0	
1,1,1-Trichloroethane	<1.0	<1.0		<1.0	<1.0		1.5	<1.0		4.2	4.0	4.9	<1.0	<1.0	
Trichloroethylene	10	25	86	15	16	6.5	1.0	1.2	18	1.7	1.8	5.7	57	56	1.8
1,1,2,2-Tetrachloroethane	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
Tetrachloroethylene	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
Toluene	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
Vinyl chloride	<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0		<1.0	<1.0	
Xylenes total	<3.0	<3.0		<3.0	<3.0		<3.0	<3.0		<3.0	<3.0		<3.0	<3.0	
Sum Volatile Organics	12	29		17	18		2.5	1.2		5.9	5.8		79	77	

-- Not analyzed.

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Appendix D

Historic Water Elevation, Water Quality Data, And Well Construction Information

List of Tables

Table D-1
Historical Water Elevation Data
Glacial Drift Wells
(elevation in feet-MSL)

Location	1	3	4	106	107	B	Q	R	S	T	U	V
10/30/1981	--	--	--	--	--	843.31	--	--	--	--	--	--
02/09/1982	--	--	--	--	--	844.45	--	--	--	--	--	--
02/16/1982	843.19	--	--	--	--	842.78	--	--	--	--	--	--
02/26/1982	842.37	--	--	--	--	842.77	--	--	--	--	--	--
03/04/1982	842.37	--	--	--	--	842.84	--	--	--	--	--	--
03/12/1982	842.28	--	--	--	--	842.72	--	--	--	--	--	--
03/17/1982	842.29	--	--	--	--	842.68	--	--	--	--	--	--
03/25/1982	842.63	835.95	833.20	--	--	824.89	--	--	--	--	--	--
04/01/1982	842.56	836.08	833.23	--	--	842.96	--	--	--	--	--	--
04/05/1982	842.54	836.07	833.30	--	--	843.03	--	--	--	--	--	--
04/08/1982	842.59	836.12	833.35	--	--	843.03	--	--	--	--	--	--
04/19/1982	842.78	836.36	833.50	--	--	843.14	--	--	--	--	--	--
11/18/1982	843.70	836.48	833.89	--	--	843.56	--	--	--	--	--	--
12/01/1982	--	--	--	--	--	843.59	--	--	--	--	--	--
02/11/1983	842.96	836.16	833.53	--	--	843.30	--	--	--	--	--	--
04/06/1983	843.44	836.88	834.11	--	--	844.13	--	--	--	--	--	--
04/28/1983	--	--	--	840.25	840.19	--	--	--	--	--	--	--
06/06/1983	842.90	837.58	834.88	839.40	839.25	844.37	--	--	--	--	--	--
09/22/1983	842.67	--	--	838.80	838.68	844.14	--	--	--	--	--	--
09/26/1983	--	836.95	834.38	--	--	--	--	--	--	--	--	--
11/11/1983	842.57	826.67	824.02	838.57	--	844.01	--	--	--	--	--	--
01/09/1984	843.49	830.13	834.07	839.40	837.36	843.93	--	--	--	--	--	--
01/16/1984	--	--	--	838.48	838.41	--	--	--	--	--	--	--
02/15/1984	--	--	--	--	--	--	830.49	827.64	829.85	832.38	837.07	--
03/28/1984	--	837.23	834.20	838.68	838.65	844.13	832.08	829.15	831.21	833.89	838.82	818.16
10/15/1985	842.68	836.57	--	--	838.42	843.89	831.58	829.00	832.00	833.96	838.11	818.61
10/28/1985	--	--	--	838.52	--	--	--	--	--	--	--	--
12/04/1985	842.38	835.19	833.40	837.12	836.96	843.86	831.22	828.73	830.95	833.37	837.30	817.99
07/06/1987	842.0	832.75	--	--	--	--	--	DRY	824.91	831.74	--	815.3
10/01/1987	842.34	834.30	--	--	--	--	--	--	826.36	832.72	--	815.93
04/05/1988	841.90	832.89	830.23	835.63	835.54	843.38	826.86	--	824.94	831.80	835.58	814.51
07/11/1988	841.69	832.45	--	--	--	--	826.46	DRY	824.63	832.44	--	814.03
10/26/1988	841.77	833.00	--	--	--	--	826.77	DRY	824.92	833.03	--	814.44
04/03/1989	841.74	833.30	830.79	--	835.34	843.17	827.45	DRY	825.23	832.25	835.72	814.19
07/12/1989	841.75	833.76	--	--	--	--	827.95	DRY	825.55	832.41	--	814.77
10/09/1989	--	833.98	--	--	--	--	828.26	DRY	826.45	832.23	--	815.16
10/13/1989	841.72	--	--	--	--	--	--	--	--	--	--	--
05/14/1990	--	833.65	830.43	--	--	--	827.08	DRY	825.92	832.14	835.86	814.64
07/10/1990	841.90	834.35	--	836.36	836.17	844.33	828.50	DRY	827.38	832.89	--	816.65
10/08/1990	841.69	834.15	--	--	--	--	828.28	DRY	827.43	832.62	--	816.70
04/01/1991	841.36	832.92	--	--	--	842.76	827.43	--	825.96	832.14	835.35	815.60
09/25/1991	842.02	834.25	--	--	--	843.46	828.90	--	828.42	833.06	836.54	818.19
05/11/1992	841.96	834.19	--	--	--	843.40	828.80	--	828.55	833.05	836.50	817.77
11/02/1992	841.98	834.02	--	--	--	843.43	828.88	--	828.09	832.61	836.21	817.27
05/18/1993	842.00	833.85	--	--	--	843.47	828.18	--	827.04	832.56	836.22	816.13
11/22/1993	842.17	834.07	--	--	--	843.64	828.42	DRY	828.07	833.74	836.42	817.17
08/03/1994	--	--	--	--	--	--	827.96	--	--	832.78	--	816.53
09/25/1995	--	--	--	--	--	--	828.27	--	--	833.03	--	817.18
08/13/1996	--	--	--	--	--	--	828.23	--	--	833.30	--	815.94
08/19/1997	--	--	--	--	--	--	829.05	--	--	833.41	--	819.59
10/13/1998	--	--	--	--	--	--	828.16	--	--	832.46	--	817.14
12/06/1999	--	--	--	--	--	--	829.05	--	--	832.86	--	817.21
11/16/2000	--	--	--	--	--	--	827.69	DRY	826.95	832.32	--	816.91
12/04/2001	--	--	--	--	--	--	828.57	--	827.31	832.50	--	817.44

-- Not measured.

Table D-1
Historical Water Elevation Data
Glacial Drift Wells
(elevation in feet-MSL)

Location	W	X	Y	Z
10/30/1981	--	--	--	--
02/09/1982	--	--	--	--
02/16/1982	--	--	--	--
02/26/1982	--	--	--	--
03/04/1982	--	--	--	--
03/12/1982	--	--	--	--
03/17/1982	--	--	--	--
03/25/1982	--	--	--	--
04/01/1982	--	--	--	--
04/05/1982	--	--	--	--
04/08/1982	--	--	--	--
04/19/1982	--	--	--	--
11/18/1982	--	--	--	--
12/01/1982	--	--	--	--
02/11/1983	--	--	--	--
04/06/1983	--	--	--	--
04/28/1983	--	--	--	--
06/06/1983	--	--	--	--
09/22/1983	--	--	--	--
09/26/1983	--	--	--	--
11/11/1983	--	--	--	--
01/09/1984	--	--	--	--
01/16/1984	--	--	--	--
02/15/1984	--	--	--	--
03/28/1984	818.25	829.00	821.15	810.0
10/15/1985	818.49	831.59	818.93	811.33
10/28/1985	--	--	--	--
12/04/1985	817.96	829.02	818.84	810.36
07/06/1987	814.4	DRY	--	--
10/01/1987	816.10	--	--	--
04/05/1988	814.59	DRY	--	--
07/11/1988	814.03	DRY	--	--
10/26/1988	814.54	DRY	--	--
04/03/1989	814.34	DRY	--	--
07/12/1989	814.86	822.05	--	--
10/09/1989	815.26	DRY	--	--
10/13/1989	--	--	--	--
05/14/1990	814.38	822.07	--	--
07/10/1990	816.75	822.95	--	--
10/08/1990	816.80	823.08	--	--
04/01/1991	815.69	DRY	--	--
09/25/1991	818.18	824.25	--	--
05/11/1992	817.81	823.41	--	--
11/02/1992	817.44	824.05	--	--
05/18/1993	816.29	822.55	--	--
11/22/1993	817.23	823.81	--	--
08/03/1994	816.66	822.63	--	--
09/25/1995	817.29	823.02	--	--
08/13/1996	816.10	822.86	--	--
08/19/1997	819.31	822.86	--	--
10/13/1998	817.28	822.96	--	--
12/06/1999	817.27	824.06	--	--
11/16/2000	817.06	822.36	--	--
12/04/2001	817.53	822.85	--	--

-- Not measured.

Table D-2
Historical Water Elevation Data
Carimona Member Wells
(elevations in feet-MSL)

Location	8	9	10	11	12	13	108 (1)	BB	RR	SS	UU	WW
10/30/1981	--	--	--	--	--	--	--	828.09	--	--	--	--
11/24/1981	--	--	--	--	--	--	--	827.85	--	--	--	--
02/09/1982	--	--	--	--	--	--	--	829.87	--	--	--	--
02/16/1982	--	--	--	--	--	--	--	827.85	--	--	--	--
02/26/1982	--	--	--	--	--	--	--	827.77	--	--	--	--
03/04/1982	--	--	--	--	--	--	--	827.85	--	--	--	--
03/09/1982	--	--	--	--	--	--	--	--	--	--	--	--
03/12/1982	--	--	--	--	--	--	--	828.61	--	--	--	--
03/17/1982	--	--	--	--	--	--	--	827.81	--	--	--	--
03/19/1982	--	--	--	--	--	--	--	--	827.73	--	--	--
03/25/1982	--	--	--	--	--	--	--	827.76	827.73	--	--	--
04/01/1982	--	--	--	--	--	--	--	827.89	827.76	--	--	--
04/05/1982	--	--	--	--	--	--	--	827.82	--	--	--	--
04/08/1982	--	--	--	--	--	--	--	827.82	827.57	--	--	--
04/19/1982	--	--	--	--	--	--	--	828.08	828.17	--	--	--
11/18/1982	828.91	--	--	--	--	--	--	829.07	829.12	835.43	828.85	828.91
12/01/1982	--	--	--	--	--	--	--	829.18	829.22	835.67	831.10	829.08
02/11/1983	--	--	--	--	--	--	--	828.89	828.98	834.07	828.98	828.76
02/14/1983	--	--	--	--	--	--	--	--	--	834.25	--	--
04/06/1983	--	--	--	--	--	--	--	829.69	829.72	834.13	829.54	829.48
04/28/1983	836.76	--	--	--	--	--	--	--	--	--	--	--
06/06/1983	835.81	--	--	--	--	--	--	829.96	829.97	834.29	829.86	829.77
09/22/1983	838.68	--	--	--	--	--	--	829.66	--	--	--	--
09/23/1983	835.51	--	--	--	--	--	--	--	--	823.15	829.55	829.45
09/26/1983	--	--	--	--	--	--	--	--	829.53	--	--	--
11/11/1983	829.98	830.06	830.03	830.02	832.30	--	830.12	830.15	830.08	833.90	830.24	829.95
01/09/1984	829.85	829.86	829.88	829.93	--	--	--	829.84	--	833.55	829.80	829.69
01/16/1984	830.1	830.08	830.12	830.13	831.76	--	830.65	830.12	828.99	833.50	830.02	829.94
03/28/1984	830.15	830.15	830.21	830.18	831.43	830.21	830.92	830.25	830.16	832.34	830.18	830.08
02/14/1985	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1985	830.58	830.61	830.62	830.65	832.11	830.01	830.77	830.26	830.19	831.76	830.63	830.60
12/04/1985	829.71	830.05	829.86	829.73	831.50	829.25	--	829.76	829.90	830.59	829.88	829.79
12/05/1985	--	--	--	--	--	--	812.90	--	--	--	--	--
02/05/1986	--	--	--	--	--	--	--	--	--	--	--	--
04/01/1986	--	--	--	--	--	--	--	--	--	--	--	--
06/06/1986	--	--	--	--	--	--	--	--	--	--	--	--
08/01/1986	--	--	--	--	--	--	--	--	--	--	--	--
10/22/1986	--	--	--	--	--	--	--	--	--	--	--	--
04/03/1987	--	--	--	--	--	--	--	--	--	--	--	--
07/06/1987	827.10	827.3	827.28	827.26	827.83	826.49	805.9	--	827.11	826.18	--	--
10/01/1987	828.79	828.69	828.72	828.79	828.63	828.14	806.06	--	828.82	827.27	--	--
04/05/1988	827.71	827.85	827.86	827.74	828.12	827.05	804.57	827.81	827.85	826.22	827.72	827.71
07/11/1988	824.91	825.12	825.07	824.97	825.40	824.36	804.45	--	825.11	824.05	--	--
10/26/1988	826.83	826.98	826.99	826.86	826.61	826.17	804.49	--	826.95	825.37	--	--
04/03/1989	827.13	827.37	827.37	827.16	827.20	826.63	807.81	827.34	827.35	825.54	827.31	827.31
07/12/1989	825.41	825.64	825.59	825.43	826.18	824.74	804.51	--	825.65	823.62	--	--
10/09/1989	827.32	827.52	827.82	827.37	826.70	826.78	--	--	--	825.12	--	--
10/13/1989	--	--	--	--	--	--	827.49	--	827.57	--	--	--
05/14/1990	827.06	827.38	827.26	827.31	827.52	826.65	--	--	827.41	824.77	827.28	827.27
07/10/1990	827.92	828.18	828.10	827.84	826.73	827.20	804.54	828.01	827.98	827.05	--	--
10/08/1990	828.38	828.59	828.58	828.41	828.23	827.78	804.64	--	828.48	826.74	--	--
04/01/1991	828.63	828.84	828.83	828.70	828.92	828.06	807.87	828.75	828.76	826.42	828.69	828.66
09/25/1991	829.19	829.40	829.40	829.15	828.46	828.55	804.55	829.25	829.41	826.95	829.23	831.23
01/03/1992	--	--	--	--	--	--	830.22	--	--	--	--	--
05/11/1992	828.87	829.02	829.01	828.93	829.26	828.29	805.36	828.93	829.08	826.42	828.92	828.89
11/02/1992	828.81	828.98	829.03	828.85	827.60	828.23	829.22	828.65	829.01	824.50	828.93	828.86
05/18/1993	827.37	827.38	827.58	827.39	826.95	826.72	824.46	827.16	827.48	822.62	827.40	827.04
11/22/1993	829.26	829.34	829.45	829.56	828.36	828.89	829.53	829.29	829.63	823.68	829.50	829.50
08/03/1994	827.58	827.59	827.67	827.85	826.94	--	--	--	--	822.79	827.90	--
09/25/1995	829.76	829.98	829.96	829.78	828.18	--	--	--	829.95	824.46	829.83	829.79

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Table D-2
Historical Water Elevation Data
Carimona Member Wells
(elevations in feet-MSL)

Location	8	9	10	11	12	13	108 (1)	BB	RR	SS	UU	WW
01/03/1996	--	829.53	--	--	--	--	--	--	--	--	--	--
08/13/1996	827.95	828.16	827.94	827.99	827.20	--	--	--	828.14	821.98	827.95	828.01
08/19/1997	830.92	831.24	831.84	831.99	829.35	--	--	--	830.38	824.40	832.33	830.26
10/13/1998	831.61	831.78	831.77	831.69	830.10	--	--	--	--	825.97	831.68	--
12/22/1998	--	--	--	--	--	--	--	--	830.25	822.95	--	830.12
12/23/1998	--	--	--	--	--	--	--	--	832.75	829.02	--	832.63
12/06/1999	831.15	831.40	831.41	831.42	829.92	--	--	--	831.36	824.39	831.41	831.28
11/16/2000	829.07	829.17	829.23	828.89	827.88	--	--	--	829.01	822.27	828.87	828.92
11/21/2000	--	--	--	--	--	--	--	--	829.01	822.83	--	828.92
11/22/2000	--	--	--	--	--	--	--	--	831.27	828.17	--	831.18
12/04/2001	829.90	830.10	830.10	829.95	828.78	--	--	--	830.04	823.32	829.92	829.94
12/05/2001	--	--	--	--	--	--	--	--	832.23	829.43	--	832.12

-- Not measured.

(1) Carimona pump-out well

Table D-3
Historical Water Elevation Data
Magnolia Member Wells
(elevations in feet-MSL)

Location	OO	QQ	TT	VV	ZZ
03/09/1982	823.60	--	--	--	--
03/17/1982	--	823.25	--	--	--
03/19/1982	823.60	823.34	--	--	--
03/25/1982	823.48	823.29	--	--	--
04/01/1982	823.64	823.37	--	--	--
04/08/1982	823.72	823.42	--	--	--
04/19/1982	823.99	823.75	--	--	--
11/18/1982	824.96	824.61	822.41	825.57	--
12/01/1982	824.79	824.41	822.59	825.76	--
02/11/1983	825.51	823.57	822.34	825.50	--
02/14/1983	--	--	822.62	--	--
04/06/1983	825.29	823.00	822.90	826.32	--
06/06/1983	825.80	825.61	823.60	826.43	--
09/23/1983	--	--	829.55	826.18	--
09/26/1983	824.71	825.20	--	--	--
11/11/1983	825.69	825.44	823.44	826.52	--
01/16/1984	825.46	--	823.26	826.32	--
03/28/1984	825.78	825.61	823.54	826.64	830.2
02/14/1985	--	--	822.62	--	--
10/15/1985	825.76	825.46	823.26	826.99	830.67
12/04/1985	825.57	825.39	822.74	826.24	830.65
02/05/1986	824.74	824.49	822.10	825.60	830.05
04/01/1986	824.75	824.52	822.10	825.60	829.65
06/06/1986	824.89	824.68	822.31	825.66	828.31
08/01/1986	824.86	824.71	822.32	825.65	829.44
10/22/1986	825.49	825.24	822.90	826.33	830.45
04/03/1987	823.87	823.66	821.46	824.83	829.25
07/06/1987	822.85	822.53	820.42	823.42	827.93
10/01/1987	824.24	823.96	821.77	824.99	829.98
04/05/1988	823.31	823.03	820.91	824.14	828.44
07/11/1988	821.14	820.82	818.88	821.73	825.73
10/26/1988	822.46	822.11	820.13	823.34	827.57
04/03/1989	822.82	822.47	820.46	823.75	828.72
07/12/1989	821.66	821.32	819.38	822.36	826.05
10/09/1989	823.07	822.70	820.69	823.98	828.20
05/14/1990	822.79	822.51	820.42	823.65	828.04
07/10/1990	823.67	823.36	821.35	824.57	828.65
10/08/1990	823.99	823.73	821.56	824.88	829.16
04/01/1991	824.52	824.25	821.75	825.46	829.44
09/25/1991	825.50	825.19	823.05	826.28	829.94
05/11/1992	825.10	824.82	822.63	825.87	829.66
11/02/1992	820.27	820.33	817.29	822.01	829.61
05/18/1993	820.42	818.46	815.64	820.33	828.12
11/22/1993	820.28	820.31	817.42	822.23	830.26
08/03/1994	--	818.90	816.30	--	--
09/25/1995	820.19	820.23	817.47	822.25	--
08/13/1996	818.66	818.66	816.01	820.74	--
08/19/1997	821.07	827.46	818.24	823.09	--
10/13/1998	--	824.01	822.04	--	--
12/22/1998	819.57	--	816.60	822.00	--
12/23/1998	827.92	--	826.14	828.93	--
12/06/1999	821.05	821.10	818.23	823.42	--
11/16/2000	818.70	818.76	815.99	820.93	--
11/21/2000	818.70	--	816.02	820.93	--
11/22/2000	826.21	--	824.80	827.07	--
12/04/2001	819.80	819.93	816.88	822.23	--
12/05/2001	827.37	--	825.83	828.32	--

-- Not measured.

Table D-4
Historical Water Elevation Data
St. Peter Sandstone Wells
(elevations in feet-MSL)

Location	200	201	202	203
10/15/1985	--	779.64	751.98	752.05
12/04/1985	758.68	--	752.60	757.58
12/05/1985	--	780.24	--	--
07/06/1987	760.63	777.82	753.86	753.43
10/01/1987	760.47	779.35	753.28	753.42
04/05/1988	761.89	780.40	753.36	753.37
07/11/1988	758.57	773.59	752.28	752.10
10/26/1988	760.78	778.42	752.53	752.43
04/03/1989	762.22	779.61	753.67	753.57
07/12/1989	758.96	775.98	752.77	752.37
10/09/1989	760.36	777.25	752.70	752.43
05/14/1990	761.79	778.59	753.72	753.29
07/10/1990	759.54	776.15	753.16	752.61
10/08/1990	759.90	776.67	752.44	751.93
04/01/1991	761.75	778.01	753.50	752.94
09/25/1991	761.38	778.26	753.38	752.96
05/11/1992	762.57	778.37	754.73	754.01
11/02/1992	763.44	780.11	754.93	754.23
05/18/1993	763.12	778.52	754.94	754.05
11/22/1993	764.00	780.11	754.86	753.79
08/03/1994	760.90	--	--	--
12/20/1994	764.19	--	--	--
09/25/1995	763.78	--	--	--
08/13/1996	762.45	--	--	--
07/02/1997	763.31	779.21	755.20	754.47
08/19/1997	762.59	777.82	753.86	753.49
10/13/1998	763.58	778.53	753.55	753.15
12/06/1999	764.97	779.76	754.04	753.68
11/16/2000	765.75	779.48	754.03	754.02
12/04/2001	766.10	780.84	754.72	754.08

-- Not measured.

Table D-5
Historical Water Elevation Data
Glacial Drift Pump-Out Wells
(elevation in feet-MSL)

Location	109	110 (1)	111 (2)	112 (2)	113 (2)
10/15/1985	837.21	835.62	829.25	829.10	829.20
12/04/1985	--	829.11	828.83	828.59	828.77
12/05/1985	828.19	--	--	--	--
07/06/1987	831.26	829.63	816.75	811.67	814.24
10/01/1987	829.94	828.98	813.70	814.64	815.68
04/05/1988	828.90	823.37	808.70	811.81	813.00
07/11/1988	831.00	822.35	815.35	807.91	812.63
10/26/1988	829.99	829.52	815.62	811.68	813.15
04/03/1989	831.41	828.90	818.43	811.80	817.22
05/14/1990	--	830.71	818.20	807.67	817.96
07/10/1990	827.27	831.02	819.07	811.77	818.80
10/08/1990	829.63	831.51	819.23	811.03	819.12
04/01/1991	826.58	826.60	817.98	808.26	817.91
09/25/1991	830.56	829.33	820.19	816.07	820.27
01/03/1992	826.56	828.73	819.50	812.12	819.42
05/11/1992	827.20	829.41	819.34	812.17	820.21
11/02/1992	827.67	830.60	820.15	815.62	820.43
05/18/1993	827.24	829.56	818.46	807.05	818.74
11/22/1993	828.06	830.81	819.26	810.43	819.83
08/13/1996	835.18	829.93	817.84	816.22	818.41
08/19/1997	828.12	830.40	819.10	813.22	819.62
10/13/1998	827.02	829.08	817.79	807.37	818.82
12/06/1999	835.37	--	825.82	815.79	820.24
11/16/2000	828.78	--	817.09	809.53	817.81
12/04/2001	828.27	--	818.03	812.83	818.51

-- Not measured.

(1) Site glacial drift pump-out wells.

(2) Down-gradient glacial drift pump-out wells.

Table D-6
Historical Water Quality Data
Glacial Drift Wells
Trichloroethylene
[Consent Order Limit: 270 ug/L]
(concentrations in ug/L)

Location	B	Q	R	S	T	U	V	W	X	1	3	4
04/05/1982	6.0	--	--	--	--	--	--	--	--	6.0	780	4.5
12/17/1982	1100	--	--	--	--	--	--	--	--	--	--	--
12/05/1983	--	--	--	--	--	--	--	--	--	--	--	380
12/12/1983	--	--	--	--	--	--	--	--	--	27	800	--
12/16/1983	780	--	--	--	--	--	--	--	--	--	--	--
02/13/1984	--	<1.3	670	770	--	--	--	--	--	--	--	--
02/14/1984	--	--	--	--	--	<1.3	--	--	--	--	--	--
02/16/1984	--	--	--	--	<1.3	--	--	--	--	--	--	--
03/16/1984	--	--	--	--	--	--	78	7.5	2.2	--	--	--
10/18/1985	--	--	1100	740	<0.3	2.6	220	8.1	2.1	--	--	--
10/21/1985	--	20	--	--	--	--	--	--	--	--	1100	--
10/28/1985	1200	--	--	--	--	--	--	--	--	1.4	--	--
11/25/1985	--	--	--	--	--	--	--	--	--	--	--	440
12/04/1985	--	--	--	--	<0.8	3.9	--	--	5.0	--	--	--
12/05/1985	--	--	--	--	--	--	--	32	--	--	--	--
12/06/1985	1100	14	820	750	--	--	140	--	--	1.5	770	440
02/06/1986	--	--	--	650	--	--	--	--	0.9 s	--	680	--
02/11/1986	--	11	--	--	<0.5	2.9	--	--	--	--	--	--
02/13/1986	--	--	--	--	--	--	180	14	--	1.4 s	--	200
02/17/1986	1300	--	31	--	--	--	--	--	--	--	--	--
04/03/1986	1000	13	--	--	<0.2	3.2	170	18	0.9	3.1	1200	210
04/04/1986	--	--	DRY	1100	--	--	--	--	--	--	--	--
06/12/1986	--	--	--	--	<0.2	--	--	--	--	--	--	180
06/13/1986	--	--	160	--	--	1.6	97	10	0.9	--	1300	--
06/17/1986	1100	4.7	--	--	--	--	--	--	--	8.1	--	--
06/19/1986	--	--	--	930	--	--	--	--	--	--	--	--
08/04/1986	--	5.6	--	--	<0.2	16	130	18	0.7	9.3	890	280
08/05/1986	1000	--	DRY	--	--	--	--	--	--	--	--	--
08/06/1986	--	--	--	880	--	--	--	--	--	--	--	--
10/23/1986	--	3.2	--	--	<0.2	1.4	--	6.2	0.5	0.9	--	--
10/29/1986	--	--	--	620	--	--	92	--	--	--	720	200
11/07/1986	830	--	--	--	--	--	--	--	--	--	--	--
04/06/1987	--	2.6	DRY	--	<0.2	2.7	--	--	--	2.7	--	--
04/07/1987	--	--	--	650	--	--	160	24	--	--	--	--
04/08/1987	--	--	--	--	--	--	--	--	--	--	740	120
04/09/1987	800	--	--	--	--	--	--	--	--	--	--	--
07/06/1987	--	--	--	740	--	--	180	--	--	0.4	770	--
07/07/1987	--	--	DRY	--	--	--	--	42	--	--	--	--
10/01/1987	--	--	--	1000	--	--	140	--	--	0.8	960	--
10/02/1987	--	--	--	--	--	--	--	56	--	--	--	--
04/05/1988*	--	--	--	--	<0.50	--	--	--	--	--	--	--
04/06/1988*	--	0.86	DRY	--	--	--	160	43	DRY	<0.50	--	--
04/08/1988*	330	--	--	460	--	--	--	--	--	--	440	55
07/13/1988*	--	--	DRY	160	--	--	33	8.1	--	0.5	140	--
10/27/1988*	--	--	DRY	110	--	--	37	26	--	<0.5	98	--
04/04/1989	--	--	--	--	<0.5	--	--	--	--	0.8	--	55
04/05/1989	--	--	--	--	--	--	130	57	--	--	--	--
04/06/1989	250	1.1	--	860	--	--	--	--	--	--	320	--
07/13/1989	--	--	--	620	--	--	120	22	--	0.6 s	340	--
10/09/1989	--	--	--	630	--	--	120	25	--	--	530	--
10/13/1989	--	--	--	--	--	--	--	--	--	0.5	--	--
05/14/1990	--	0.7	--	--	--	--	--	--	--	--	--	--
05/16/1990	--	--	--	710	<0.5	--	110	31	--	--	520	77
07/10/1990	--	--	--	200	--	--	120	<0.5	--	--	--	--
07/12/1990	--	--	--	--	--	--	--	--	--	--	770	--
07/13/1990	330	--	--	--	--	--	--	--	--	0.8	--	--
10/08/1990	--	--	--	--	--	--	--	--	--	<0.5	--	--
10/09/1990	--	--	--	770	--	--	110	11	--	--	310	--

Table D-6
Historical Water Quality Data
Glacial Drift Wells
Trichloroethylene
[Consent Order Limit: 270 ug/L]
(concentrations in ug/L)

Location	B	Q	R	S	T	U	V	W	X	1	3	4
04/01/1991	--	--	--	--	--	--	--	--	--	--	1500	--
04/02/1991	--	0.7	--	--	<0.5	2.0	--	40	--	3.1	--	--
04/03/1991	340	--	--	870	--	--	130	--	--	--	--	--
09/26/1991	--	--	--	480	--	--	73	20	--	1.3	300	--
05/12/1992	510	--	--	510	--	--	63	--	--	2.2	400	--
05/13/1992	--	<1.0	--	--	<1.0	<1.0	--	5.9	<1.0	--	--	--
11/03/1992	--	--	--	770	--	--	83	1.3	--	0.5	170	--
05/18/1993	580	<0.50	--	390	<0.50	0.7	68	--	<0.50	<0.50	470	--
05/19/1993	--	--	--	--	--	--	--	2.9	--	--	--	--
11/22/1993	--	--	--	--	--	--	100	2.9	--	<0.50	740	--
11/23/1993	--	--	--	400	--	--	--	--	--	--	--	--
08/03/1994	--	<0.5	--	--	<0.5	--	69	8.4	<0.5	--	--	--
09/25/1995	--	<0.50	--	--	<0.50	--	94	0.80	<0.50	--	--	--
08/13/1996	--	--	--	--	--	--	--	--	<0.5	--	--	--
08/14/1996	--	<0.5	--	--	<0.5	--	100	1.4	--	--	--	--
08/20/1997	--	--	--	--	--	--	--	--	<0.5	--	--	--
08/21/1997	--	<0.5	--	--	<0.5	--	19	1.5	--	--	--	--
10/14/1998	--	--	--	--	<0.5	--	--	--	--	--	--	--
10/15/1998	--	<0.5	--	--	--	--	140	15	<0.5	--	--	--
12/07/1999	--	--	--	--	<1.0	--	--	--	<1.0	--	--	--
12/08/1999	--	<1.0	--	--	--	--	83	15	--	--	--	--
11/16/2000	--	--	--	--	<1.0	--	97	17	<1.0	--	--	--
11/17/2000	--	<1.0	--	--	--	--	--	--	--	--	--	--
12/05/2001	--	1.6	--	--	--	--	--	--	--	--	--	--
12/06/2001	--	--	--	--	<1.0	--	91	14	<1.0	--	--	--

-- Not analyzed.

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

Table D-7
Historical Water Quality Data
Carimona Member Wells
Trichloroethylene
[Consent Order Limit: 27 ug/L]
(concentrations in ug/L)

Location	BB	RR	SS	UU	WW	8	9	10	11	12	13	108
05/21/1982	--	46	--	--	--	--	--	--	--	--	--	--
06/09/1982	1600	--	--	--	--	--	--	--	--	--	--	--
12/10/1982	--	--	<0.05	--	2100	--	--	--	--	--	--	--
12/13/1982	--	--	--	78	--	--	--	--	--	--	--	--
12/17/1982	--	43	--	--	--	--	--	--	--	--	--	--
12/20/1982	1600	--	--	--	--	--	--	--	--	--	--	--
04/28/1983	--	--	--	--	--	820	--	--	--	--	--	--
11/02/1983	--	--	--	--	--	--	--	--	--	--	--	1100
12/02/1983	--	--	<1.5	--	--	--	--	--	--	--	--	--
12/05/1983	--	--	--	81	--	96	<0.05	2.6	120	--	--	--
12/06/1983	--	33	--	--	--	--	--	--	--	--	--	--
12/09/1983	--	--	--	--	1700	--	--	--	--	--	--	--
12/12/1983	--	--	--	--	--	--	--	--	--	<1.5	--	--
12/15/1983	1400	--	--	--	--	--	--	--	--	--	--	--
01/17/1984	--	--	--	--	--	--	--	--	--	--	--	1000
01/18/1984	--	--	--	--	--	--	--	--	--	--	--	1100
01/19/1984	--	--	--	--	--	--	--	--	--	--	--	1100
01/20/1984	--	--	--	--	--	--	--	--	--	--	--	1100
03/07/1984	--	--	--	--	--	--	--	--	--	--	25	--
10/18/1985	--	--	--	--	--	--	--	--	2.7	--	1.9	--
10/22/1985	--	110	0.4 s	150	2300	--	--	--	--	--	--	--
10/28/1985	1900	--	--	--	--	--	--	--	--	--	--	--
10/30/1985	--	--	--	--	--	2300	17	1500	--	--	--	--
11/18/1985	--	--	--	--	--	--	--	--	--	--	--	1500
11/25/1985	--	--	--	--	--	--	--	--	--	<0.2	--	--
12/04/1985	--	--	--	--	--	650	10	1100	520	<0.8	21	820
12/06/1985	--	--	1.2	79	1200	--	--	--	--	--	--	--
12/09/1985	1100	--	--	--	--	--	--	--	--	--	--	--
12/10/1985	--	95	--	--	--	--	--	--	--	--	--	--
02/06/1986	--	88	--	--	--	--	--	--	--	<0.5	--	--
02/07/1986	--	--	--	--	--	--	--	--	--	--	--	700
02/10/1986	--	--	--	--	740	--	--	--	--	--	--	--
02/11/1986	--	--	--	--	--	240	6.7	420	250	--	9.7	--
02/12/1986	1300	--	<0.5	71	--	--	--	--	--	--	--	--
04/02/1986	--	--	0.4	--	--	--	--	--	--	--	--	--
04/03/1986	--	--	--	--	--	180	8.0	290	120	0.5	120	--
04/04/1986	2200	--	--	81	540	--	--	--	--	--	--	--
04/08/1986	--	--	--	--	--	--	--	--	--	--	--	750
04/18/1986	--	170	--	--	--	--	--	--	--	--	--	--
06/12/1986	--	--	--	--	--	140	6.1	280	--	<0.2	130	640
06/13/1986	--	--	0.3	--	--	--	--	--	--	--	--	--
06/17/1986	--	--	--	--	--	--	--	--	58	--	--	--
06/18/1986	--	85	--	37	--	--	--	--	--	--	--	--
06/19/1986	2100	--	--	--	290	--	--	--	--	--	--	--
08/04/1986	--	--	--	--	--	--	--	--	67	--	14	--
08/05/1986	--	--	0.3	--	--	160	--	270	--	--	--	--
08/06/1986	--	--	--	45	220	--	6.7	--	--	0.2	--	--
08/07/1986	1800	100	--	--	--	--	--	--	--	--	--	580
10/22/1986	--	--	--	--	--	--	--	--	--	<0.2	--	--
10/23/1986	--	--	<0.2	--	--	--	5.4	--	--	--	0.5	--
10/24/1986	--	--	--	36	--	--	--	--	40	--	--	--
10/29/1986	--	--	--	--	--	--	--	--	--	--	--	540
11/01/1986	--	--	--	--	--	110	--	220	--	--	--	--
11/03/1986	--	100	--	--	--	--	--	--	--	--	--	--
11/04/1986	1300	--	--	--	290	--	--	--	--	--	--	--
04/06/1987	--	--	--	12	--	--	5.1	--	160	<0.2	140	--

Table D-7
Historical Water Quality Data
Carimona Member Wells
Trichloroethylene
[Consent Order Limit: 27 ug/L]
(concentrations in ug/L)

Location	BB	RR	SS	UU	WW	8	9	10	11	12	13	108
04/08/1987	--	110	--	--	290	86	--	120	--	--	--	--
04/09/1987	1100	--	--	--	--	--	--	--	--	--	--	450
04/10/1987	--	--	1.2	--	--	--	--	--	--	--	--	--
07/06/1987	--	--	--	--	--	--	0.6	150	--	<0.2	--	580
07/07/1987	--	--	--	--	--	--	--	--	25	--	--	--
10/01/1987	--	--	--	--	--	--	9.5	170	--	<0.5	--	--
10/02/1987	--	--	--	--	--	--	--	--	180	--	--	560
04/05/1988*	--	--	<0.50	23	--	--	--	--	--	--	--	--
04/06/1988*	--	220	--	--	--	--	--	--	--	--	<0.50	--
04/07/1988*	--	--	--	--	320	160	4.5	56	--	<0.5	--	--
04/08/1988*	530	--	--	--	--	--	--	--	79	--	--	200
07/13/1988*	--	--	--	--	--	--	1.7	34	0.3	<0.5	--	96
10/27/1988*	--	--	--	--	--	--	--	--	0.7	--	--	--
10/28/1988*	--	--	--	--	--	--	10	58	--	1.0 s	--	87
04/04/1989	--	--	1.3	38	--	--	--	--	--	--	--	--
04/05/1989	--	--	--	--	--	--	--	--	110	--	110	--
04/06/1989	340	180	--	--	530	380	9.8	160	--	<0.5	--	530
07/13/1989	--	--	--	--	--	--	9.9	99	3.6	2.1	--	340
10/09/1989	--	--	--	--	--	--	--	--	5.0	--	--	--
10/10/1989	--	--	--	--	--	--	12	140	--	<0.5	--	--
12/21/1989	--	--	--	--	--	--	--	--	--	--	--	490
05/15/1990	--	--	--	--	--	100	8.5	150	--	0.7	--	--
05/16/1990	--	60	4.1	35	450	--	--	--	<0.5	--	110	570
07/10/1990	--	--	--	--	--	--	--	--	16	--	--	--
07/11/1990	--	--	--	--	--	--	43	180	--	<0.5	--	400
07/13/1990	530	--	--	--	--	--	--	--	--	--	--	--
10/09/1990	--	--	--	--	--	--	9.4	130	240	<0.5	--	420
04/01/1991	--	--	--	--	--	--	--	--	--	--	--	710
04/02/1991	--	--	--	64	--	--	--	--	--	--	--	--
04/03/1991	1100	150	4.5	--	420	--	--	--	8.7	--	<0.5	--
04/04/1991	--	--	--	--	--	80	7.3	110	--	<0.5	--	--
09/25/1991	--	--	--	--	--	--	--	--	--	--	--	76
09/26/1991	--	--	--	--	--	--	10	120	3.2	<0.5	--	--
05/12/1992	--	90	--	--	700	--	--	--	190	--	71	--
05/13/1992	870	--	2.2	23	--	--	--	--	--	--	--	--
05/14/1992	--	--	--	--	--	--	3.2	--	--	<1.0	--	380
05/15/1992	--	--	--	--	--	47	--	58	--	--	--	--
11/04/1992	--	--	--	--	--	--	--	--	66	--	--	--
11/05/1992	--	--	--	--	--	--	2.4	59	--	<0.5	--	--
05/18/1993	--	--	2.5	29	130	--	--	--	120	--	26	--
05/19/1993	940	93	--	--	--	92	1.9	46	--	<0.50	--	--
06/08/1993	--	--	--	--	--	--	--	--	--	--	--	640
11/23/1993	--	--	--	--	--	--	0.78	43	180	<0.50	--	300
08/03/1994	--	--	1.0	8.6	--	--	--	--	21	--	--	--
08/04/1994	--	--	--	--	--	38	0.81	20	--	<0.5	--	--
09/26/1995	--	--	--	--	--	40	--	38	--	<0.50	--	--
09/27/1995	--	--	0.89	6.0	--	--	--	--	3.3	--	--	--
01/03/1996	--	--	--	--	--	--	<0.50	--	--	--	--	--
08/13/1996	--	--	--	--	--	35	3.0	24	--	<0.5	--	--
08/14/1996	--	--	2.2	47	--	--	--	--	17	--	--	--
08/20/1997	--	--	--	--	--	36	3.7	34	12	<0.5	--	--
08/21/1997	--	--	1.4	48	--	--	--	--	--	--	--	--
10/13/1998	--	--	--	--	--	44	4.8	42	--	--	--	--
10/14/1998	--	--	<0.5	23	--	--	--	--	16	<0.5	--	--
12/07/1999	--	--	<1.0	44	--	--	--	--	55	--	--	--
12/09/1999	--	--	--	--	--	30	--	32	--	--	--	--

Table D-7
Historical Water Quality Data
Carimona Member Wells
Trichloroethylene
[Consent Order Limit: 27 ug/L]
(concentrations in ug/L)

Location	BB	RR	SS	UU	WW	8	9	10	11	12	13	108
12/21/1999	--	--	--	--	--	--	15	--	--	<1.0	--	--
11/17/2000	--	--	<1.0	50	--	--	--	--	60	--	--	--
11/19/2000	--	--	--	--	--	53	<1.0	23	--	--	--	--
11/21/2000	--	--	--	--	--	--	--	--	--	<1.0	--	--
12/05/2001	--	--	2.0	56	--	--	--	--	70	1.1	--	--
12/10/2001	--	--	--	--	--	57	2.2	27	--	--	--	--

-- Not analyzed.

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

s Potential false positive value based on statistical analysis of blank sample data.

3/1/02 11 29 AM
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Table D-8
Historical Water Quality Data
Magnolia Member Wells
Trichloroethylene
[Consent Order Limit: 27 ug/L]
(concentrations in ug/L)

Location	OO	QQ	TT	VV	ZZ	14
05/17/1982	15	--	--	--	--	--
06/09/1982	--	13	--	--	--	--
12/10/1982	--	--	8.9	--	--	--
12/15/1982	--	13	--	--	--	--
12/17/1982	56	--	--	--	--	--
03/22/1984	--	--	--	--	14	--
10/22/1985	49	--	26	140	--	--
10/28/1985	--	2.9	--	--	--	--
10/30/1985	--	--	--	--	85	--
12/04/1985	--	--	--	--	28	--
12/06/1985	--	7.3	19	93	--	--
12/10/1985	31	--	--	--	--	--
02/06/1986	--	--	--	--	200	--
02/10/1986	--	--	27	92	--	--
02/12/1986	36	--	--	--	--	--
02/17/1986	--	5.2	--	--	--	--
04/02/1986	120	--	33	--	--	--
04/03/1986	--	--	--	--	440	--
04/04/1986	--	--	--	280	--	--
04/10/1986	--	6.0	--	--	--	--
06/12/1986	--	--	--	--	91	--
06/18/1986	27	--	20	--	--	--
06/19/1986	--	1.0	--	83	--	--
08/05/1986	--	--	40	--	39	--
08/06/1986	--	0.6	--	99	--	--
08/07/1986	19	--	--	--	--	--
10/23/1986	32	6.4	--	--	--	--
10/24/1986	--	--	23	77	190	--
04/06/1987	--	--	34	--	--	--
04/07/1987	130	2.5	--	63	--	--
04/09/1987	--	--	--	--	230	--
04/05/1988*	--	--	16	--	--	--
04/06/1988*	160	<0.50	--	63	--	--
04/07/1988*	--	--	--	--	130	--
07/13/1988*	20	--	--	9.4	--	--
10/27/1988*	34	--	--	25	--	--
10/28/1988*	--	--	--	--	43	--
04/04/1989	--	--	30	59	--	--
04/05/1989	--	3.7	--	--	180	--
04/06/1989	90	--	--	--	--	--
07/13/1989	70	--	--	87	--	--
07/14/1989	--	--	--	--	34	--
10/09/1989	--	--	--	150	--	--
10/10/1989	67	--	--	--	33	--
05/15/1990	--	--	--	--	120	--
05/16/1990	58	3.4	26	33	--	--
07/10/1990	--	--	--	27	--	--
07/11/1990	--	--	--	--	61	--
07/12/1990	62	--	--	--	--	--
10/09/1990	30	--	--	46	36	--
04/01/1991	--	--	140	--	--	--
04/03/1991	5.1	<0.5	--	75	--	--
04/04/1991	--	--	--	--	170	--
09/26/1991	5.0	--	--	48	30	--

Table D-8
Historical Water Quality Data
Magnolia Member Wells
Trichloroethylene
[Consent Order Limit: 27 ug/L]
(concentrations in ug/L)

Location	OO	QQ	TT	VV	ZZ	14
05/13/1992	3.1	--	58	60	--	--
05/14/1992	--	--	--	--	88	--
06/01/1992	--	4.7	--	--	--	--
11/04/1992	17	--	--	--	--	--
11/05/1992	--	--	6.4	29	96	--
05/18/1993	--	--	0.7	190	--	--
05/19/1993	11	13	--	--	73	--
11/22/1993	--	--	1.8	150	--	--
11/23/1993	5.7	--	--	--	70	--
08/03/1994	--	3.2	1.4	--	--	--
09/25/1995	--	--	1.5	--	--	--
09/27/1995	--	3.7	--	--	--	--
08/13/1996	--	2.2	--	--	--	--
08/14/1996	--	--	1.0	--	--	--
08/21/1997	--	1.8	1.9	--	--	--
10/14/1998	--	--	0.5	--	--	--
10/15/1998	--	<0.5	--	--	--	<0.5
11/12/1998	--	--	--	--	--	--
12/07/1999	--	--	6.4	--	--	--
12/08/1999	--	<1.0	--	--	--	4.9
11/16/2000	--	<1.0	--	--	--	--
11/17/2000	--	--	7.8	--	--	8.2
12/05/2001	--	--	8.4	--	--	9.6
12/06/2001	--	<1.0	--	--	--	--

-- Not analyzed.

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

Table D-9
Historical Water Quality Data
St. Peter Sandstone Wells
Trichloroethylene
(concentrations in ug/L)

Location	200	201	202	203
10/30/1985	--	0.5 s	--	--
11/07/1985	120	--	--	--
11/25/1985	--	--	2.6	0.5 s
12/04/1985	--	--	2.0	--
12/05/1985	--	2.9	--	1.2
12/26/1985	100	--	--	--
02/06/1986	--	--	1.9	--
02/11/1986	--	<0.5	--	2.5
02/12/1986	72	--	--	--
04/03/1986	--	<0.2	0.2	--
04/04/1986	130	--	--	0.6
06/13/1986	110	<0.2	0.2 s	0.5
08/05/1986	--	<0.2	2.7	0.5
08/07/1986	110	--	--	--
10/22/1986	--	<0.2	<0.2	0.5
10/29/1986	78	--	--	--
04/07/1987	--	0.1	<0.2	0.7
04/09/1987	100	--	--	--
07/06/1987	120	--	--	--
10/05/1987	160	--	--	--
04/07/1988*	89	<0.50	<0.50	<0.50
07/13/1988*	33	--	--	--
10/28/1988*	56	--	--	--
04/05/1989	150	<0.5	<0.5	2.1
07/14/1989	130	--	--	--
10/10/1989	120	--	--	--
05/15/1990	--	<0.5	0.8	2.8
05/16/1990	110	--	--	--
07/11/1990	11 *	--	--	--
10/09/1990	130	--	--	--
04/04/1991	140	<0.5	<0.5	3.0
09/26/1991	77	--	--	--
05/14/1992	--	<1.0	<1.0	1.2
05/15/1992	61	--	--	--
11/04/1992	64	--	--	--
05/19/1993	89	<0.50	<0.50	1.4
11/23/1993	19	--	--	--
12/20/1994	110	--	--	--
09/26/1995	110	--	--	--
08/13/1996	96	--	--	--
07/02/1997	98	<0.5	<0.5	5.4
08/20/1997	97	<0.5	--	5.0
12/23/1997	--	--	<0.5	--
10/14/1998	58	--	--	4.5
10/15/1998	--	--	<0.5	--
12/09/1999	30	--	<1.0	4.1
11/19/2000	<1.0	--	<1.0	7.2
12/07/2001	6.4	--	--	--
12/10/2001	--	--	<1.0	15

-- Not measured.

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

* Estimated value, QA/QC criteria not met.

s Potential false positive value based on statistical analysis of blank sample data.

Table D-10
Historical Water Quality Data
Prairie Du Chien/Jordan Well
Trichloroethylene
(concentrations in ug/L)

Location	HENKEL
10/28/1985	71
12/06/1985	44
02/12/1986	48
04/11/1986	OFF
06/19/1986	OFF
08/05/1986	54
11/10/1986	6.9
04/07/1987	7.1
07/06/1987	20
10/01/1987	6.7
04/06/1988*	13
07/13/1988*	1.5
10/27/1988*	8.0
04/04/1989	12
07/24/1989	10
10/13/1989	11
07/11/1991	49
09/26/1991	18
05/15/1992	31
11/03/1992	<0.5
05/19/1993	16
11/23/1993	36
08/04/1994	6.1
12/27/1995	6.5
08/14/1996	9.2
08/21/1997	13
10/15/1998	8.2
12/08/1999	<1.0
11/21/2000	<1.0
12/07/2001	7.1

-- Not analyzed.
s Potential false positive value based on statistical analysis of blank sample data.
* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

Table D-11
Historical Water Quality Data
Site Pump-Out and Treatment System
Downgradient Pump-Out System
Trichloroethylene
(concentrations in ug/L)

Location	Discharge (1)	Influent (2)	Effluent 100/50 (3)	MG-Effluent (4)
11/07/1985	160	--	--	--
11/18/1985	--	1200	13	--
11/25/1985	--	970	6.9	--
12/04/1985	--	690	6.1	--
12/05/1985	140	--	--	--
12/09/1985	--	870	12	--
12/17/1985	--	670	6.5	--
01/13/1986	--	1100	17	--
02/07/1986	290	760	8.4	--
03/12/1986	--	1700	14	--
04/04/1986	--	860	11	--
04/08/1986	400	--	--	--
06/12/1986	250	--	--	--
08/07/1986	350	870	6.7	--
10/29/1986	190	610	1.0	--
03/27/1987	320	730	6.8	--
04/09/1987	170	530	8.3	--
07/06/1987	--	660	2.8	--
07/07/1987	310	--	--	--
10/02/1987	230	--	--	--
10/05/1987	--	720	<0.5	--
11/06/1987	--	490	2.6	--
01/12/1988 *	300	470	4.4	--
04/08/1988 *	210	370	5.3	--
04/15/1988 *	--	600	--	--
07/13/1988 *	70	160	1.2	--
10/28/1988 *	64	--	--	--
11/09/1988 *	--	84	3.7	--
01/31/1989	210	390	9.8	--
04/06/1989	200	440	13	--
07/13/1989	--	380	20	--
07/14/1989	170	--	--	--
10/10/1989	110	--	--	--
12/21/1989	--	140	190	--
01/16/1990	140	380	96	--
05/16/1990	220	--	1.2	--
05/17/1990	--	370	--	--
07/11/1990	--	310	0.9	--
07/12/1990	180	--	--	--
10/09/1990	--	360	2.9	--
10/10/1990	100	--	--	--
01/11/1991	150	430	0.8	--
04/01/1991	290	890	1.0	--
07/11/1991	210	370	<0.5	--
09/25/1991	110	320	<0.5	--
01/03/1992	99	260	<1.0	--
05/14/1992	--	320	8.3	--
05/15/1992	55	--	--	--
08/26/1992	78	420	15	--
11/03/1992	110	450	28	32
03/02/1993	130	--	--	--
03/08/1993	--	270	<0.50	--
05/19/1993	82	450 h	<0.50	22
08/23/1993	83	530	<0.50	33
11/23/1993	78	630	<0.50	24

Table D-11
Historical Water Quality Data
Site Pump-Out and Treatment System
Downgradient Pump-Out System
Trichloroethylene
(concentrations in ug/L)

Location	Discharge (1)	Influent (2)	Effluent 100/50 (3)	MG-Effluent (4)
03/08/1994	140	540	<0.5	25
06/09/1994	60	430	<0.5	23
08/04/1994	58	310	<0.5	17
12/20/1994	65	400	<0.50	18
03/31/1995	93	650	7.6	26
05/25/1995	87	580	20	25
09/29/1995	53	450	0.63	15
12/27/1995	68	410	2.7	15
03/11/1996	63	360	38	18
07/02/1996	77	390	1.0	21
08/13/1996	40	400	64	19
11/04/1996	59	370	<0.5	22
02/27/1997	89	390	1.8	22
05/05/1997	90	390	3.8	23
08/20/1997	82	370	68	17
12/23/1997	64	410	38	19
01/27/1998	56	370	0.5	19
04/16/1998	52.1	384.5	2.0	19.9
08/27/1998	125.2	442.2	<0.5	30.5
10/13/1998	59	418.6	200	40
01/13/1999	74	315	33	18.6
06/25/1999	64	280	140	16.6
08/11/1999	--	280	130	16
12/06/1999	56	--	--	17.4
03/17/2000	--	--	<1.0	--
04/26/2000	32	280	<1.0	18
09/12/2000	94	300	<1.0	21
11/27/2000	--	--	<1.0	--
02/28/2001	--	--	<1.0	--
05/18/2001	75	230	<1.0	15
08/30/2001	--	--	<1.0	--
11/15/2001	--	--	<1.0	--

-- Not analyzed.

(1) Flow rate weighted composite sample (pump-out wells 111, 112, and 113)

(2) Flow rate weighted composite sample (pump-out wells 108, 109, and 110 from 1985 to 1993, pump-out wells 109 and 110 from 1994 to present).

(3) Effluent from treatment system. NPDES daily limit: 100 ug/L and NPDES annual average limit: 50 ug/L.

(4) Flow rate weighted composite sample (Effluent from site pump-out wells MG1 and MG2).

* The 1988 analytical data has been determined to be unreliable due to laboratory equipment and method performance problems.

h EPA sample extraction or analysis holding time was exceeded.

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
1	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
1	12/12/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
1	10/28/1985		<1.0	--	1.6 s	--	--	--	--	--	7.8 s
1	02/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
1	02/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
1	06/17/1986		<1.0	--	1.5 s	--	--	--	--	--	<1.0
1	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
2	04/05/1982		54	--	<0.2	--	--	--	--	--	44
2	12/12/1983		550	--	310	--	--	--	--	--	480
3	04/05/1982		130	--	<0.2	--	--	--	--	--	13
3	12/12/1983		35	--	6.0	--	--	--	--	--	<31
3	10/21/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
3	02/06/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
3	02/06/1986		<25	<25	<25	<25	--	<25	--	<25	--
3	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
3	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
4	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
4	12/05/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
4	11/25/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
4	02/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
4	06/12/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
4	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
4	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
5	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
5	12/06/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
8	04/28/1983		< =150	--	<0.2	--	--	--	--	--	<0.2
8	12/05/1983		<5.3	--	<4.5	--	--	--	--	--	<31
8	09/26/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
8	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
8	12/09/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
9	12/05/1983		<5.3	--	<4.5	--	--	--	--	--	<31
9	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
9	01/03/1996		<0.50	--	<0.50	--	--	--	--	--	<0.50
9	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
9	12/21/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
10	12/05/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
10	09/26/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
10	09/26/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
10	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
10	12/09/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
11	12/05/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
11	06/17/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
11	10/27/1988		<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--
11	09/27/1995		0.78	--	<0.50	--	--	--	--	--	<0.50
11	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
11	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
12	12/12/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
12	02/06/1986		<0.50	<0.50	<0.50	<0.50	--	<0.50	--	<0.50	--
12	09/26/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
12	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
12	12/21/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
13	03/07/1984		<0.25	--	<0.3	--	--	--	--	--	<0.3
13	05/16/1990		<1.0	--	<1.0	--	--	--	--	--	<1.0
14	10/15/1998		<0.5	--	0.6	--	<1.0	<0.5	--	--	--
14	10/15/1998	DUP	<0.5	--	<0.5	--	<1.0	<0.5	--	--	--

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
14	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
106	04/15/1983		15000	--	62000	--	--	--	--	--	18000
106	04/28/1983		_840	--	18000	--	--	--	--	--	4000
106	12/12/1983		710	--	3800	--	--	--	--	--	2600
107	04/28/1983		< =190	--	4.2	--	--	--	--	--	<0.2
107	12/12/1983		7.5	--	12	--	--	--	--	--	<31
107	10/28/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
107	02/12/1986		<1.0	--	7.3	--	--	--	--	--	8.3
107	06/18/1986		2.6	--	3.8	--	--	--	--	--	2.7
107	06/18/1986		4.6	--	3.3	--	--	--	--	--	2.1
107	11/07/1986		64	--	120	--	--	--	--	--	19
108	11/02/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
108	01/20/1984		<5.5	--	<0.3	--	--	--	--	--	<0.3
108	04/09/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	--
108	12/21/1989		<20	--	<20	--	--	--	--	--	<20
109	04/16/1998		<3.0	--	9.8	--	3.9	<3.0	--	--	--
109	08/27/1998		<4.0	--	21	--	<4.0	<4.0	--	--	--
109	08/27/1998	DUP	<4.0	--	18	--	<4.0	<4.0	--	--	--
109	10/13/1998		<4.0	--	4.2	--	<8.0	<4.0	--	--	--
109	01/13/1999		<5.0	--	<5.0	--	--	--	--	--	<15
109	06/25/1999		<5.0	--	8.0	--	--	--	--	--	<15
109	03/17/2000		<5.0	--	17	--	--	--	--	--	<15
109	11/27/2000		<2.0	--	<2.0	--	--	--	--	--	<6.0
109	02/28/2001		<2.0	--	<2.0	--	--	--	--	--	<6.0
110	04/16/1998		<6.0	--	<6.0	--	<6.0	<6.0	--	--	--
110	08/27/1998		<10	--	<10	--	<10	<10	--	--	--
110	10/13/1998		<10	--	<10	--	<8.0	<10	--	--	--
110	01/13/1999		<5.0	--	<5.0	--	--	--	--	--	<15
110	06/25/1999		<5.0	--	<5.0	--	--	--	--	--	<15
110	03/17/2000		<10	--	<10	--	--	--	--	--	<30
110	11/27/2000		<5.0	--	<5.0	--	--	--	--	--	<15
110	02/28/2001		<5.0	--	<5.0	--	--	--	--	--	<15
111	04/16/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
111	08/27/1998		<0.5	--	<0.5	--	<0.5	--	--	--	--
111	10/13/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
111	01/13/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
111	06/25/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
111	03/17/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
111	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
111	02/28/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
112	04/16/1998		<0.8	--	<0.8	--	<0.8	<0.8	--	--	--
112	08/27/1998		<1.0	--	<1.0	--	<1.0	<1.0	--	--	--
112	10/13/1998		<1.3	--	<1.3	--	<2.5	<1.3	--	--	--
112	01/13/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
112	06/25/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
112	06/25/1999	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
112	12/06/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
112	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
112	02/28/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
113	05/19/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
113	04/16/1998		<2.0	--	<2.0	--	<2.0	<2.0	--	--	--
113	08/27/1998		2.0	--	<2.0	--	<2.0	<2.0	--	--	--
113	10/13/1998		<2.0	--	<2.0	--	<4.0	<2.0	--	--	--
113	01/13/1999		<2.0	--	<2.0	--	--	--	--	--	<6.0
113	06/25/1999		<5.0	--	<5.0	--	--	--	--	--	<15

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
113	12/06/1999		<2.0	--	<2.0	--	--	--	--	--	<6.0
113	03/17/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
113	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
113	02/28/2001		<2.0	--	<2.0	--	--	--	--	--	<6.0
200	11/07/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
200	04/09/1987		<0.5	<0.5	<0.5	<0.50	--	<0.50	<0.50	--	<0.50
200	07/06/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
200	10/05/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	<1.0
200	10/05/1987		1.0	<0.5	<0.5	<0.5	--	--	<0.5	--	<0.5
200	05/16/1990		<1.0	--	<1.0	--	--	--	--	--	<1.0
200	05/16/1990		<1.0	--	<1.0	--	--	--	--	--	<1.0
200	12/20/1994		<0.50	--	<0.50	--	--	--	--	--	<0.50
200	09/26/1995		<1.0	--	<1.0	--	--	--	--	--	<1.0
200	08/20/1997		<1.5	--	<1.5	--	<1.5	<1.5	--	--	--
200	12/09/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
200D	04/09/1987		<0.5	<0.5	<0.5	<0.50	--	--	<0.50	--	<0.50
200D	07/06/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
200D	07/06/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
200D	10/05/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	<1.0
200D	10/05/1987		<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	<0.5
201	04/07/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	<0.50
201	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
202	02/06/1986		<0.50	<0.50	<0.50	<0.50	--	<0.50	--	<0.50	--
202	12/23/1997		<0.5	--	0.8 b	--	<0.5	<0.5	--	--	--
202	12/09/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
202	12/09/1999	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
203	08/20/1997		<0.5	--	<0.5	--	<0.5	0.6	--	--	--
203	12/09/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
200263	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
200384	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
200603	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
200815	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
223839	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
A	06/24/1981		200	--	180	--	--	--	--	--	52
A	04/28/1983		< =290	--	49	--	--	--	--	--	14
A	12/15/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
B	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
B	12/17/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
B	12/16/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
B	10/28/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
B	02/17/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
B	06/17/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
B	11/07/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
B	04/09/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	<0.50
BB	06/09/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
BB	12/20/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
BB	12/15/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
DIB	10/31/1985		0.47	--	1.4	--	--	--	--	--	9.12
DIB	11/01/1985		0.16	--	0.35	--	--	--	--	--	1.50
DIB	11/01/1985		0.08	--	0.17	--	--	--	--	--	0.18
DIB	11/02/1985		0.37	--	0.60	--	--	--	--	--	3.4
DIB	11/02/1985		0.19	--	<1.0	--	--	--	--	--	6.7
DIB	11/02/1985		0.22	--	0.22	--	--	--	--	--	0.85
DIB	11/03/1985		0.28	--	0.35	--	--	--	--	--	0.34
DIB	11/03/1985		0.17	--	<1.0	--	--	--	--	--	1.22

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
DIB	11/04/1985		0.13	--	<1.0	--	--	--	--	--	<1.0
DIB	11/04/1985		0.19	--	3.26	--	--	--	--	--	7.1
DIB	11/22/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
DIB	11/23/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
DIB	02/04/1986		<1.0	--	0.70	--	--	--	--	--	<1.0
DIB	02/05/1986		<1.0	--	0.88	--	--	--	--	--	<1.0
DIB	02/13/1986		<1.0	--	0.28	--	--	--	--	--	1.40
DIB	02/14/1986		<1.0	--	0.39	--	--	--	--	--	<1.0
DIB	02/16/1986		<1.0	--	0.28	--	--	--	--	--	1.40
DIB	02/17/1986		<1.0	--	0.32	--	--	--	--	--	1.21
DIB	02/18/1986		0.17	--	0.48	--	--	--	--	--	1.24
DIB	02/19/1986		0.35	--	0.34	--	--	--	--	--	1.55
DIB	02/20/1986		<1.0	--	0.29	--	--	--	--	--	1.23
DIB	02/21/1986		0.32	--	0.27	--	--	--	--	--	1.52
DIB	02/21/1986		<1.0	--	0.19	--	--	--	--	--	0.20
DIB	02/22/1986		0.72	--	0.56	--	--	--	--	--	<1.0
DSCHRG	11/07/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	02/07/1986		<1.0	--	<1.0	--	--	--	--	--	1.8
DSCHRG	06/12/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	04/09/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	10/02/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	04/08/1988		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	10/28/1988		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	04/06/1989		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	10/10/1989		<5.0	--	<5.0	<5.0	--	<5.0	--	<5.0	--
DSCHRG	05/16/1990		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	10/10/1990		<5	<5	14	--	--	--	--	--	<5
DSCHRG	04/01/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	09/25/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	05/15/1992		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	11/03/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	05/19/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	11/23/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	03/08/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	06/09/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	08/04/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	12/20/1994		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	03/31/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	05/25/1995		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	05/25/1995		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	09/29/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	12/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	03/11/1996		<0.50	--	<0.50	--	--	--	--	--	<0.50
DSCHRG	07/02/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	08/13/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	08/13/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	11/04/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
DSCHRG	02/27/1997		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	05/05/1997		<1.0	--	<1.0	--	--	--	--	--	<1.0
DSCHRG	08/20/1997		<1.0	--	<1.0	--	<1.0	<1.0	--	--	--
DSCHRG	08/20/1997	DUP	<1.0	--	<1.0	--	<1.0	<1.0	--	--	--
DSCHRG	12/23/1997		<1.0	--	<1.0	--	<1.0	<1.0	--	--	--
DSCHRG	12/23/1997	DUP	<1.0	--	1.2 b	--	<1.0	1.1	--	--	--
DSCHRG	01/27/1998		<1.0	--	<1.0	--	<1.0	<1.0	--	--	--

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
DSCHRG	10/13/1998		<1.0	--	<1.0	--	<2.0	<1.0	--	--	--
DSCHRG	04/26/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
DSCHRG	09/12/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
DSCHRG	05/18/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
E	12/12/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
EFF	11/18/1985		<1.0	--	1.3	--	--	--	--	--	1.9
EFF	12/04/1985		1.7	--	4.1	--	--	--	--	--	<1.3
EFF	12/09/1985		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	01/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	02/07/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	04/04/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	08/07/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	04/09/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	10/05/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	11/06/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	04/08/1988		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	11/09/1988		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	04/06/1989		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	12/21/1989		<10	--	<10	--	--	--	--	--	<10
EFF	05/16/1990		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	10/09/1990		<0.5	<0.5	<1.0	--	--	--	--	--	<0.5
EFF	04/01/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	09/25/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	05/14/1992		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	11/03/1992		0.6	--	1.2	--	--	--	--	--	<0.5
EFF	05/19/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	11/23/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	03/08/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	06/09/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	08/04/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	12/20/1994		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	03/31/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	05/25/1995		<1.0	--	<1.0	--	--	--	--	--	<1.0
EFF	09/29/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	12/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	12/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	03/11/1996		<0.50	--	<0.50	--	--	--	--	--	<0.50
EFF	07/02/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	08/13/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	11/04/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	02/27/1997		<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	02/27/1997	DUP	<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	05/05/1997		<0.5	--	0.7 b	--	--	--	--	--	<0.5
EFF	05/05/1997	DUP	<0.5	--	<0.5	--	--	--	--	--	<0.5
EFF	08/20/1997		<0.8	--	<0.8	--	<0.8	<0.8	--	--	--
EFF	12/23/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
EFF	01/27/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
EFF	04/16/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
EFF	08/27/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
EFF	10/13/1998		<2.0	--	<2.0	--	<4.0	<2.0	--	--	--
EFF	01/13/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	01/13/1999	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	06/25/1999		<5.0	--	<5.0	--	--	--	--	--	<15
EFF	08/11/1999		<2.0	--	<2.0	--	--	--	--	--	<6.0

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
EFF	08/11/1999	DUP	<2.0	--	<2.0	--	--	--	--	--	<6.0
EFF	03/17/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	04/26/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	09/12/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	02/28/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	05/18/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
EFF	08/30/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
F	12/06/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
GC	04/05/1982		54	--	<1	--	--	--	--	--	44
GC/MS	04/05/1982		9	--	<10	--	--	--	--	--	<10
GG	06/09/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
GG	12/20/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
H	12/08/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
H	10/21/1985		<1.0	--	<1.0	--	--	--	--	--	3.5 s
H	02/06/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
H	02/06/1986		<10	<10	<10	<10	--	<10	--	<10	--
H	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
H	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
HENKEL	04/07/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	--
HENKEL	07/06/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
HENKEL	10/01/1987		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
HENKEL	10/13/1989		<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	--
HENKEL	12/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
HENKEL	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
HENKEL	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
II	06/10/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
II	12/13/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
II	12/09/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
INF	11/18/1985		48	--	36	--	--	--	--	--	6.5
INF	12/04/1985		14	--	15	--	--	--	--	--	3.0
INF	12/09/1985		19	--	14	--	--	--	--	--	<1.0
INF	01/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
INF	02/07/1986		<1.0	--	<1.0	--	--	--	--	--	1.2
INF	04/04/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
INF	08/07/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
INF	10/29/1986		31	--	39	--	--	--	--	--	6.0
INF	04/09/1987		2.7	--	1.0	--	--	--	--	--	<1.0
INF	04/09/1987		3.7	<4.2	<4.3	--	--	--	--	--	--
INF	10/05/1987		29	--	57	--	--	--	--	--	8.8
INF	11/06/1987		<1.0	--	<1.0	--	--	--	--	--	<1.0
INF	04/08/1988		<1.0	--	<1.0	--	--	--	--	--	<1.0
INF	04/15/1988		<25	<25	<25	--	--	--	--	--	--
INF	11/09/1988		3.5	--	<1.0	--	--	--	--	--	<1.0
INF	04/06/1989		7.3	--	7.3	--	--	--	--	--	<5.0
INF	04/06/1989		<12	<12	<12	--	--	--	--	--	--
INF	12/21/1989		<10	--	<10	--	--	--	--	--	<10
INF	05/17/1990		10 j	<12	18	--	--	--	--	--	6 j
INF	10/09/1990		7.4	1.8	15	--	--	--	--	--	7.7
INF	04/01/1991		40	--	80	--	--	--	--	--	9.2
INF	04/01/1991		43	4 j	100	--	--	--	--	--	20
INF	09/25/1991		18	--	36	--	--	--	--	--	13
INF	05/14/1992		<1.0	--	140	--	--	--	--	--	36
INF	05/14/1992		28	2 j	70	--	--	--	--	--	22
INF	11/03/1992		8.3	--	29	--	--	--	--	--	6.6

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
INF	05/19/1993		6.3	--	23	--	--	--	--	--	5.3
INF	05/19/1993		10	2 j	30	--	--	--	--	--	10
INF	11/23/1993		14	--	72	--	--	--	--	--	21
INF	03/08/1994		1.2	--	1.7	--	--	--	--	--	1.1
INF	06/09/1994		8.8	--	36	--	--	--	--	--	19
INF	06/09/1994		10	--	40	--	--	--	--	--	21
INF	08/04/1994		1.1	--	5.5	--	--	--	--	--	2.3
INF	12/20/1994		4.7	--	32	--	--	--	--	--	8.4
INF	03/31/1995		0.98	--	5.8	--	--	--	--	--	2.0
INF	05/25/1995		3.2	--	26	--	--	--	--	--	9.4
INF	09/29/1995		2.5	--	18	--	--	--	--	--	7.5
INF	12/27/1995		3.5	--	37	--	--	--	--	--	11
INF	03/11/1996		1.0	--	7.4	--	--	--	--	--	3.0
INF	03/11/1996		1.0	--	6.8	--	--	--	--	--	3.0
INF	07/02/1996		<0.5	--	5.4	--	--	--	--	--	<0.5
INF	07/02/1996		<0.5	--	6.1	--	--	--	--	--	<0.5
INF	08/13/1996		1.3	--	12	--	--	--	--	--	4.0
INF	11/04/1996		<2	--	<2	--	--	--	--	--	<2
INF	02/27/1997		<5.0	--	<5.0	--	--	--	--	--	<5.0
INF	05/05/1997		<5.0	--	7.8	--	--	--	--	--	<5.0
INF	08/20/1997		<6.3	--	21	--	8.6	<6.3	--	--	--
INF	12/23/1997		<6.3	--	<6.3	--	<6.3	<6.3	--	--	--
INF	01/27/1998		<6.3	--	<6.3	--	<6.3	<6.3	--	--	--
INF	01/27/1998	DUP	<5.0	--	<5.0	--	<5.0	<5.0	--	--	--
INF	08/11/1999		<5.0	--	<5.0	--	--	--	--	--	<15
INF	04/26/2000		<10	--	<10	--	--	--	--	--	<30
INF	04/26/2000	DUP	<10	--	<10	--	--	--	--	--	<30
INF	09/12/2000		<5.0	--	<5.0	--	--	--	--	--	<15
INF	09/12/2000	DUP	<5.0	--	<5.0	--	--	--	--	--	<15
INF	05/18/2001		<5.0	--	21	--	--	--	--	--	<15
INFD	10/05/1987		29	--	57	--	--	--	--	--	8.8
INFMS	05/19/1993		<25	<25	<25	--	--	--	--	--	16 j
INFMSD	05/19/1993		<25	<25	<25	--	--	--	--	--	17
J	12/08/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
J	01/05/1984		<0.2	--	<0.2	--	--	--	--	--	<0.2
J	10/21/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
J	02/10/1986		<1.0	--	<1.0	--	--	--	--	--	1.2
J	06/19/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
J	11/03/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
K	12/09/1983		<5.3	--	<4.5	--	--	--	--	--	<31
LL	05/17/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
LL	12/15/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
LL	12/08/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
MB	04/01/1991		<5	<5	<5	--	--	--	--	--	<5
MB	04/01/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	04/02/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	06/07/1991		<1.0	<1.0	<1.0	--	--	--	--	--	<1.0
MB	09/25/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	09/26/1991		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	05/14/1992		<1.0	--	<1.0	--	--	--	--	--	<1.0
MB	05/14/1992		<1.0	<5	<1.0	--	--	--	--	--	<1.0
MB	05/15/1992		<1.0	--	<1.0	--	--	--	--	--	<1.0
MB	11/03/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	11/04/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5
MB	11/05/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
MG1	06/07/1991		<1.0	<1.0	<1.0	--	--	--	--	--	<1.0
MG1	04/16/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MG1	08/27/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MG1	10/13/1998		<0.5	--	<0.5	--	<1.0	<0.5	--	--	--
MG1	01/13/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	06/25/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	12/06/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	03/17/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	03/17/2000	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	02/28/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG1	08/30/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	04/16/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MG2	04/16/1998	DUP	<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MG2	08/27/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MG2	01/13/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	06/25/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	12/06/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	03/17/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	11/27/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	02/28/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	02/28/2001	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
MG2	08/30/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
MGEFF	11/03/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	11/03/1992		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	05/19/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	05/19/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	11/23/1993		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	03/08/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	03/08/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	06/09/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	08/04/1994		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	12/20/1994		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	12/20/1994		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	03/31/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	03/31/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	05/25/1995		<1.0	--	<1.0	--	--	--	--	--	<1.0
MGEFF	09/29/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	12/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	03/11/1996		<0.50	--	<0.50	--	--	--	--	--	<0.50
MGEFF	07/02/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	08/13/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	11/04/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	11/04/1996		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	02/27/1997		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	05/05/1997		<0.5	--	<0.5	--	--	--	--	--	<0.5
MGEFF	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MGEFF	12/23/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MGEFF	01/27/1998		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
MGEFF	08/11/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
MGEFF	04/26/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MGEFF	09/12/2000		<1.0	--	<1.0	--	--	--	--	--	<3.0
MGEFF	05/18/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
MGEFF	05/18/2001	DUP	<1.0	--	<1.0	--	--	--	--	--	<3.0
MPLS	04/05/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
N	12/06/1983		8.3	--	<0.2	--	--	--	--	--	<0.2
N	01/05/1984		76	--	*	--	--	--	--	--	*
N	01/15/1984		76	--	<0.2	--	--	--	--	--	<0.2
OO	05/17/1982		<0.2	--	11	--	--	--	--	--	<0.2
OO	12/17/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
P	12/02/1983		<5.3	--	<4.5	--	--	--	--	--	<0.2
PP	06/10/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
PP	12/20/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
Q	10/21/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
Q	02/11/1986		<1.0	--	<1.0	--	--	--	--	--	1.5 s
Q	06/17/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Q	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Q	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Q	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
Q	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
Q	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
QQ	06/09/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
QQ	12/15/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
QQ	04/07/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	--
QQ	09/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
QQ	08/21/1997		<0.5	--	1.0	--	0.9	0.6	--	--	--
QQ	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
R	10/18/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
R	02/17/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
R	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
R	04/06/1987		--	--	DRY	--	--	--	--	--	DRY
RR	05/21/1982		<0.2	--	26	--	--	--	--	--	37
RR	12/17/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
RR	12/06/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
RR	02/06/1986		<5.0	<5.0	<5.0	<5.0	--	<5.0	--	<5.0	--
S	10/18/1985		<1.0	--	3.0 s	--	--	--	--	--	12
S	02/06/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
S	06/19/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
S	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
S	04/07/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	--
S	05/16/1990		<10	--	<10	--	--	--	--	--	<10
SS	12/10/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
SS	12/02/1983		<0.2	--	<4.5	--	--	--	--	--	<0.2
SS	09/27/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
SS	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
SS	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
STRM	01/20/1984		<5.5	--	<0.3	--	--	--	--	--	<0.3
T	10/18/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
T	02/11/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
T	06/12/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
T	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
T	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
T	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
T	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
TT	12/10/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
TT	09/25/1995		3.6	--	<0.50	--	--	--	--	--	<0.50
TT	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
TT	08/21/1997	DUP	<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
TT	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
U	10/18/1985		<1.0	--	<1.0	--	--	--	--	--	5.3 s

Table D-12
Historic Water Quality
BTEX Recovery and Monitoring Wells
General Mills
(concentrations in ug/L)

Location	Date	Dup	Benzene	Ethyl benzene	Toluene	Xylene m-	Xylene m & p	Xylene o-	Xylene o & p	Xylene p-	Xylenes total
U	02/11/1986		<1.0	--	<1.0	--	--	--	--	--	1.3
U	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
U	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
UU	12/13/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
UU	12/05/1983		<5.3	--	<0.2	--	--	--	--	--	<0.2
UU	09/27/1995		1.3	--	<0.50	--	--	--	--	--	<0.50
UU	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
UU	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
V	10/18/1985		<1.0	--	<1.0	--	--	--	--	--	<3.0
V	02/13/1986		<1.0	--	<1.0	--	--	--	--	--	1.1
V	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
V	10/29/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
V	10/27/1988		<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--
V	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
V	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
V	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
W	10/18/1985		<1.0	--	1.7 s	--	--	--	--	--	9.2 s
W	02/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
W	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
W	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
W	04/07/1987		2.5	<0.50	<0.50	<0.50	--	--	<0.50	--	--
W	10/27/1988		<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--
W	05/16/1990		--	--	--	--	--	--	--	--	<1.0
W	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
W	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
W	08/21/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
W	12/08/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
W109	08/30/2001		2.8	--	25	--	--	--	--	--	18
W111	08/30/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
W111	08/30/2001		<1.0	--	<1.0	--	--	--	--	--	<3.0
W113	08/30/2001		<2.0	--	<2.0	--	--	--	--	--	<6.0
WW	12/10/1982		<0.2	--	<0.2	--	--	--	--	--	<0.2
WW	12/09/1983		<0.2	--	<0.2	--	--	--	--	--	<0.2
X	10/18/1985		<1.0	--	<1.0	--	--	--	--	--	3.4 s
X	02/06/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
X	02/06/1986		<0.50	<0.50	<0.50	<0.50	--	<0.50	--	<0.50	--
X	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	1.1 s
X	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
X	09/25/1995		<0.50	--	<0.50	--	--	--	--	--	<0.50
X	08/20/1997		<0.5	--	<0.5	--	<0.5	<0.5	--	--	--
X	12/07/1999		<1.0	--	<1.0	--	--	--	--	--	<3.0
Y	10/18/1985		<1.0	--	4.0	--	--	--	--	--	19
Y	02/11/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Y	02/11/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Y	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Y	06/13/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Y	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Z	10/18/1985		<1.0	--	5.0	--	--	--	--	--	11
Z	02/06/1986		<1.0	--	<1.0	--	--	--	--	--	1.3 s
Z	06/18/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
Z	10/23/1986		<1.0	--	<1.0	--	--	--	--	--	<1.0
ZZ	03/22/1984		<0.25	--	<0.3	--	--	--	--	--	<0.3
ZZ	02/06/1986		--	<5.0	--	<5.0	--	<5.0	--	<5.0	--
ZZ	04/09/1987		<0.50	<0.50	<0.50	<0.50	--	--	<0.50	--	--
ZZ	10/27/1988		<0.5	<0.5	<0.5	<0.5	--	--	<0.5	--	--

List of Wells and Piezometers
General Mills East Hennepin Avenue Site

Well	Geologic Unit	Classification (1)
A	Glacial Drift	Abandoned
B	Glacial Drift	
C	Glacial Drift	Abandoned
D	Glacial Drift	Abandoned
E	Glacial Drift	Abandoned
F	Glacial Drift	Abandoned
G	Glacial Drift	
H	Glacial Drift	Abandoned
J	Glacial Drift	Abandoned
K	Glacial Drift	Abandoned
L	Glacial Drift	Abandoned
M	Glacial Drift	Abandoned
N	Glacial Drift	Lost
P	Glacial Drift	Abandoned
Q	Glacial Drift	
R	Glacial Drift	
S	Glacial Drift	
T	Glacial Drift	
U	Glacial Drift	
V	Glacial Drift	
W	Glacial Drift	
X	Glacial Drift	
Y	Glacial Drift	Abandoned
Z	Glacial Drift	Abandoned
1	Glacial Drift	
2	Glacial Drift	
3	Glacial Drift	
4	Glacial Drift	
5	Glacial Drift	
106	Glacial Drift	
107	Glacial Drift	
109*	Glacial Drift	
110*	Glacial Drift	

List of Wells and Piezometers (cont.)
General Mills East Hennepin Avenue Site

Well	Geologic Unit	Classification (1)
111*	Glacial Drift	
112*	Glacial Drift	
113*	Glacial Drift	
108*	Carimona Member	No longer used for pumping
8	Carimona Member	
9	Carimona Member	
10	Carimona Member	
11	Carimona Member	
12	Carimona Member	
13	Carimona Member	
BB	Carimona Member	
GG	Magnolia Member	
II	Carimona/Magnolia	Abandoned
LL	Carimona/Magnolia	Abandoned
OO	Magnolia Member	
PP	Carimona Member	Abandoned
QQ	Magnolia Member	
RR	Carimona Member	
SS	Carimona Member	
TT	Magnolia Member	
UU	Carimona Member	
VV	Magnolia Member	
WW	Carimona Member	
ZZ	Magnolia Member	
MG-1*	Magnolia Member	
MG-2*	Magnolia Member	
200	St. Peter	
201	St. Peter	
202	St. Peter	
203	St. Peter	
Henkel	Prairie du Chien	

* Pumping well
(1) Unless otherwise noted, wells still exist.

TABLE 1

WELL CONSTRUCTION DATA
BEDROCK PIEZOMETERS AND WELLS

ID No.	Borehole Diameter	Casing Diameter	Elevation, Top of Casing	Elevation, Ground Surface	Elevation, Top of Screen or Open Hole	Screen Length	Open Borehole Length	Elevation of Bottom of Screen or Open Hole	Elevation, Top of Sand Pack	Elevation, Bottom of Sand Pack	Elevation, Top of Carimona	Elevation, Carimona/ Magnolia Contact	Formation/ Member Completed In
BB	3"	1½"	864.61	862.7	797.8	5	-	792.8	802.7	792.5	802.7	798.7	Car./Mag.
GG	3"	1½"	856.21	854.9	795.9	10	-	785.9	800.9	785.9	802.4	798.9	Car./Mag.
II	3"	2"	856.18	854.9	800.0	10	-	790.0	802.7	787.6	802.2	798.2	Car./Mag.
LL	3"	1½"	852.24	851.5	797.2	2	-	795.2	802.5	787.1	802.5	798.5	Car./Mag.
OO	3"	1½"	850.07	849.5	791.1	2	-	789.1	794.0	786.0	801.3	797.5	Magnolia
PP	3"	1½"	850.28	849.3	796.3	2	-	794.3	801.6	786.2	801.3	797.3	Car./Mag.
QQ	3"	1½"	849.01	848.3	791.0	2	-	789.0	795.8	782.7	797.8	796.5	Magnolia
RR	4"	1½"	849.97	849.4	799.0	2	-	797.0	801.1	796.4	801.2	798.2	Carimona
SS	6"	2"	861.70	859.7	801.8	2	-	799.8	804.1	799.1	803.6	799.0	Carimona
TT	6"	2"	861.94	859.6	792.7	2	-	790.7	795.3	788.9	803.6	799.6	Magnolia
UU	6"	2"	863.98	862.4	802.6	2	-	800.6	804.8	783.4	805.2	800.4	Car./Mag.
VV	6"	2"	859.09	856.8	790.6	2	-	788.6	793.2	784.2	800.8	797.0	Magnolia
WW	6"	2"	857.76	856.4	799.3	2	-	797.3	802.1	797.1	800.8	797.0	Carimona
ZZ	4"	4"	850.25	847.3	795.8	-	5.0	790.8	-	-	800.2	796.6	Magnolia
8	4"	4"	860.36	858.6	800.6	-	3.6	797.0	-	-	800.6	797.0	Carimona
9	4"	4"	862.48	860.5	803.3	-	4.0	799.3	-	-	803.3	798.6	Carimona
10	4"	4"	860.39	858.4	799.4	-	3.0	796.4	-	-	800.0	796.0	Carimona
11	4"	4"	852.84	850.2	802.2	-	5.7	798.2	-	-	802.2	797.7	Carimona
12	4"	4"	861.10	858.6	802.6	-	5.5	797.1	-	-	802.6	798.6	Carimona
13	4"	4"	849.25	847.2	801.7	-	4.5	797.7	-	-	802.2	796.6	Carimona
108	6"	6"	860.58	858.3	802.3	-	3.5	798.8	-	-	802.3	798.1	Carimona

TABLE 2

WELL CONSTRUCTION DATA
SHALLOW WELLS AND PIEZOMETERS

ID No.	Elevation, Top of Casing	Elevation, Ground Surface	Casing Diameter (in)	Screen Length (ft)	Elevation, of Top of Screen	Elevation, of Bottom of Screen
A	860.00	858.0	2	10	855.5	845.4
B	864.28	861.5	2	10	844.9	834.9
C	865.00	863.1	2	10	846.6	836.6
D	857.24	855.2	2	10	844.2	834.2
E	860.80	858.8	2	10	842.3	832.3
F	865.34	863.3	2	10	840.3	830.3
G	856.30	854.3	2	10	840.8	830.8
H	857.39	855.4	2	10	840.4	830.4
K	852.43	851.4	1½	2	831.4	829.4
L	852.21	851.4	1½	2	831.2	829.2
M	851.18	850.6	1½	2	828.2	826.2
N	849.47	848.7	1½	2	826.5	824.5
J	851.85	851.0	1½	2	828.9	826.9
P	850.37	849.5	1½	2	828.0	826.0
Q	850.38	848.3	2	10	834.4	824.4
R	843.19	841.3	2	10	831.8	821.8
S	843.15	846.3	2	10	831.8	821.8
T	849.36	847.3	2	10	835.3	825.3
U	854.50	852.5	2	10	841.3	831.3
V	838.59	837.0	2	10	821.4	811.4
W	830.78	829.2	2	10	822.1	812.1
X	842.90	840.8	2	10	831.8	821.8
Y	835.69	833.8	2	10	821.5	811.5
Z	833.23	831.3	2	10	812.4	802.4
1	864.04	861.4	4	10	843.4	833.4
2	857.21	854.0	4	10	838.0	828.0
3	853.64	851.7	5	10	838.2	828.2
4	851.23	849.3	5	10	836.3	826.3
5	849.46	847.7	5	10	833.7	823.7
106	861.20	858.4	2	5	838.4	833.4
107	860.10	858.2	6	5	824.2	819.2

GENERAL MILLS/HENNEPIN AVE. SITE
23/27-169AMG01
MASTER FILE - SUMMARY OF MONITORING LOCATIONS
SHALLOW WELLS AND PIEZOMETERS
Last Update: June 14, 1985

ID No.	Top of Riser Elevation (MSL)	Ground Surface Elevation (MSL)	Total Borehole Depth (ft)	Riser Pipe Diameter (in)	Screen Length (ft)	Top of Screen Elevation (MSL)	Bottom of Screen Elevation (MSL)	water level 3/24/84	Approx depth to water
A	860.00	858.0	27	2" Galv.	10' Stainless	855.5	845.4		
B	864.28	861.5	26.6	2" PVC	10' PVC	844.9	834.9	843.1	20.2
C	865.00	863.1	26.5	2" PVC	10' PVC	846.6	836.6		
D	857.24	855.2	21.0	2" PVC	10' PVC	844.2	834.2		
E	860.80	858.8	26.5	2" PVC	10' PVC	842.3	832.3		
F	865.34	863.3	33.0	2" PVC	10' PVC	840.3	830.3		
G	856.30	854.3	23.5	2" PVC	10' PVC	840.8	830.8		
H	857.39	855.4	25.0	2" PVC	10' PVC	840.4	830.4	838.6	16.8
K	852.43	851.4	22.0	1 1/2" PVC	2' Porous PE	831.4	829.4		
L	852.21	851.4	22.2	1 1/2" PVC	2' Porous PE	831.2	829.2		
M	851.18	850.6	24.4	1 1/2" PVC	2' Porous PE	828.2	826.2		
N	849.47	848.7	24.2	1 1/2" PVC	2' Porous PE	826.5	824.5		
J	851.85	851.0	25.5	1 1/2" PVC	2' Porous PE	828.9	826.9	835.4	16.5
P	850.37	849.5	25.0	1 1/2" PVC	2' Porous PE	828.0	826.0		
Q	850.38	848.3	23.9	2" PVC	10' Stainless	834.4	824.4	832.1	18.3
R	843.19	841.3	19.5	2" PVC	10' Stainless	831.8	821.8	824.2	19.0
S	848.15	846.3	24.5	2" PVC	10' Stainless	831.8	821.8	831.2	17.0
T	849.36	847.3	22.0	2" PVC	10' Stainless	835.3	825.3	832.9	17.5
U	854.50	852.5	21.2	2" PVC	10' Stainless	841.3	831.3	836.3	18.1
V	838.59	837.0	25.6	2" PVC	10' Stainless	821.4	811.4	814.1	22.5
W	830.78	829.2	17.1	2" PVC	10' Stainless	822.1	812.1	816.3	12.5
X	842.90	840.8	19.0	2" PVC	10' Stainless	831.8	821.8	824.0	16.9
Y	835.69	833.8	31.5	2" PVC	10' Stainless	821.5	811.5	821.2	24.2
Z	833.23	831.3	36.5	2" PVC	10' Stainless	812.4	802.4	810.0	23.2
1	864.04	861.4	28	4" Galv.	10' Galv.	843.4	833.4	838.5	22'
2	857.21	854.0	27	4" Galv.	10' Galv.	838.0	828.0		
3	853.64	851.7	23.5	5" Galv.	10' Galv.	838.2	828.2	837.2	16.4
4	851.23	849.3	23	5" Galv.	10' Galv.	836.3	826.3	833.2	17.9
5	849.46	847.7	24	5" Galv.	10' Galv.	833.7	823.7		
106	861.20	858.4		2"	5'	838.4	833.4		
107	860.10	858.2	39	6" Steel	5' Stainless	824.2	819.2	838.1	21.9
109	859.97	857.8	42	10" Steel	24' Stainless	839.8	815.8		
110	852.06	851.3	40	8" Steel	20' Stainless	834.3	814.3		
111	846.94	846.2	43	8" Steel	20' Stainless	826.2	806.2		
112	841.37	840.5	39	8" Steel	20' Stainless	824.5	804.5		
113	841.26	840.3	43	8" Steel	20' Stainless	820.3	800.3		

WELL LOG

BARR ENGINEERING CO.
Minneapolis, Minnesota

Project General Mills — Well No. MG-1

Date Started 5/8/91

Date Completed 5/15/91 — Riser Pipe Elevation 861.01

Field Inspector G. Remple (Barr)

Crew Chief D. Davidson (E.H. Renner & Sons) — Ground Surface Elevation 858.51

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
Borehole advanced from 0 to 57' (858.51 - 801.51) using 17 1/2" diameter tricone mud rotary. 12" diameter steel casing centered in borehole and grouted in place with neat cement grout. Neat cement grout hardened at least 48 hours. Borehole advanced from 57 to 62' (801.51-796.51) using 5 7/8" diamter tricone mud rotary. 6" diameter steel riser centered in borehole and grouted in place with neat cement grout. Neat cement grout hardened at least 48 hours. Borehole advanced from 62 to 72' (796.51-786.51) using 5 7/8" diameter tricone mud rotary. Water level measured on 5/21/91 at 825.24.	Unconsolidated Glacial Sediments 51.0' Shale Decorah Formation 54.0' Limestone Carimona Member Platteville Formation 61.5' Limestone Magnolia Member Platteville Formation 72.0' E.O.B.	▽ 825.24 801.51 796.51 786.51	12-inch diameter steel casing from 1' above ground surface to 57' depth (801.51). Annulus between 12-inch casing and 17 1/2-inch borehole filled with neat cement grout 0 to 57' (858.51-801.51). 6-inch diamter steel riser from 2.5' above ground surface to 62' depth (796.51). Annulus between 6-inch casing and 12" casing/ borehole filled with neat cement grout 57 to 62' (801.51-796.51). Well was developed on 5/16/91 for 4 1/2 hours at 98 gpm using a submersible pump. All development water was discharged to the storm sewer.

Comments: Vertical Scale: 1" = 10', Elevations are in feet MSL

WELL LOG

BARR ENGINEERING CO.
Minneapolis, Minnesota

Project General Mills — Well No. MG-2

Date Started 5/14/91

Date Completed 5/20/91 — Riser Pipe Elevation 861.14

Field Inspector G. Remple (Barr)

Crew Chief D. Davidson (E.H. Renner & Sons) — Ground Surface Elevation 857.79

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
Borehole advanced from 0 to 54.5' (857.29- 803.29) using 17 1/2" diameter tricone mud rotary. 12" diameter steel casing centered in borehole and grouted in place with neat cement grout. Neat cement grout hardened at least 48 hours. Borehole advanced from 54.5 to 62' (803.29-795.79) using 11 7/8" diameter tricone mud rotary. 6" diameter steel riser centered in borehole and grouted in place with neat cement grout. Neat cement grout hardened at least 48 hours. Borehole advanced from 62 to 72' (795.79-785.79) using 5 7/8" diameter tricone mud rotary. Water level measured on 5/22/91 at 824.94.	Unconsolidated Glacial Sediments 54.0' Limestone Carimona Member Platteville Formation 60.0' Limestone Magnolia Member Platteville Formation 72.0' E.O.B.	824.94 803.29 795.79 785.79	12-inch diameter steel casing from 2' above ground surface to 54.5' depth (803.29). Annulus between 12-inch casing and 17 1/2-inch borehole filled with neat cement grout 0 to 57' (858.51-801.51). 6-inch diameter steel riser from 3.35' above ground surface to 62' depth (795.79). Annulus between 6-inch casing and 12" casing/ borehole filled with neat cement grout. Well was developed on 5/16/91 by surging.

Comments: Vertical Scale: 1" = 10', Elevations are in feet MSL

Sheet 1 of 1

WELL LOG

BARR ENGINEERING CO.
Minneapolis, Minnesota

Project General Mills Solvent Disposal Site — Well No. 200

Date Started _____

Date Completed April 26, 1984 — Riser Pipe Elevation 851.14

Field Inspector _____

Crew Chief J. Ryan (Tri-State)[1] — Ground Surface Elevation 848.1

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
Cable tool method 24" diameter casing driven 0'-85' (848.1-763.1)[2] 24" diameter open hole advanced 85'-200' (763.1-648.1) Initial groundwater level 90' (758.1)	Coarse Gravel 40'[3] 48' Limestone (Platteville) 81'[4] 85' (563.1) Sandstone (St. Peter) 200' (EOB 648.1)	848.1 763.1 758.1 ▽ 728.1 648.1	24" diameter casing 0'-85' (848.1-563.1) 16" diameter casing 0'-120' (848.1-728.1) 80' long, 16" diameter galvanized steel well screen 120'-200' (728.1-648.1) Inner annulus filled with neat cement grout 0'-85' (841.1-763.1) Gravel pack from 85'-200' (763.1-648.1) Protective locking cap

Comments:
[1] Well installed by Tri-State Drilling Co. for the City of Mpls.
[2] Elevation ft., MSL
[3] Clay and boulders, 40'-48' (608.1-600.1)
[4] Glenwood shale, 81'-85' (567.1-563.1)

WELL LOG

BARR ENGINEERING CO.
Minneapolis, Minnesota

Project: General Mills Solvent Disposal Site
Well No.: 201
Date Started: 8/8/84
Date Completed: 8/22/84
Riser Pipe Elevation: 885.09
Field Inspector: R. Manser (BEC)
Crew Chief: R. Renner (EHR)
Ground Surface Elevation: 882.9

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
Mud rotary method 0'-79' (882.9-803.9)[1]	(882.9)	882.9	14" diameter casing 0'-80' (882.9-802.9)
	Coarse Sand and Gravel		
Cable tool method 79'-142' (803.9-740.9)			8" diameter casing 0'-118' (882.9-764.9)
20" diameter borehole advanced by mud rotary method 0'-79' (882.9-803.9)	78' (804.9) Limestone (Platteville)	803.9	4" diameter casing 0'-117' (882.9-765.9) 2.2' stickup
		767.9 ▽	
	115'[2]	765.9	
	116'	764.9	
	Sandstone (St. Peter)		
14" diameter open hole advanced by cable tool method 79'-118' (803.9-764.9)	142' (EOB 740.9)	745.9 740.9	20' long, 4" diameter #10 slot stainless steel well screen 117'-137' (765.9-745.9)
			Inner annuli filled with neat cement grout: 0'-79' (20" BH) 0'-116' (14" BH) 0'-114' (8" BH)
8" diameter open hole advanced by cable tool method 118'-142' (764.9-740.9)			
			Sand pack from 114'-142' (768.9-740.9)
Initial groundwater level 106' (767.9)			Protective locking cap

Comments: [1]Elevation ft., MSL
[2]Glenwood shale, 115'-116' (767.9-766.9)

Sheet 1 of 1

WELL LOG

BARR ENGINEERING CO.
Minneapolis, Minnesota

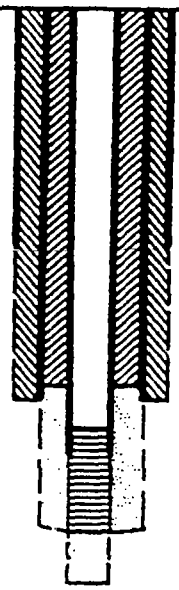
Project General Mills Solvent Disposal Site — Well No. 202

Date Started 1/10/85

Date Completed 2/10/85 — Riser Pipe Elevation 843.45

Field Inspector R. Manser (BEC)

Crew Chief B. Ledbetter (EHR) — Ground Surface Elevation 840.9

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION		WELL CONSTRUCTION NOTES
Cable tool method	(804.9)		840.9	14" diameter casing 0'-47' (840.9-793.9)
14" diameter casing driven 0'-47' (840.9-793.9)[1]	Sand and Gravel			
	44'[2]			8" diameter casing 0'-77' (840.9-763.9)
	47'		793.9	2' stickup
	(793.9) Limestone (Platteville)			
14" diameter open hole advanced 47'-77' (793.9-763.9)			767.9	4" diameter casing 0'-84' (840.9-756.9)
	75'[3]		763.9	
	78'			
	(762.9)		756.9	
	Sandstone (St. Peter)		745.9 ▽	
8" diameter open hole advanced 77'-102' (763.9-738.9)			736.9	20' long, 4" diameter stainless steel well screen, 84'-104' (756.9-736.9)
	114'		726.9	
	(EOB 726.9)			
Bail down screen 102'-106' (738.9-734.9)				4" diameter leader casing, 104'-106' (736.9-734.9)
4" diameter open hole advanced 106'-114' (734.9-726.9)				Inner annuli filled with neat cement grout: 0'-77' (14" BH) 0'-73' (8" BH)
				Sand pack from 73'-102' (767.9-738.9)
Initial groundwater level 95' (745.9)				Protective locking cap

Comments:
[1] Elevation ft., MSL
[2] Decorah shale, 44'-45' (796.9-795.9)
[3] Glenwood shale, 75'-78' (765.9-767.9)

Sheet 1 of 1

WELL LOG

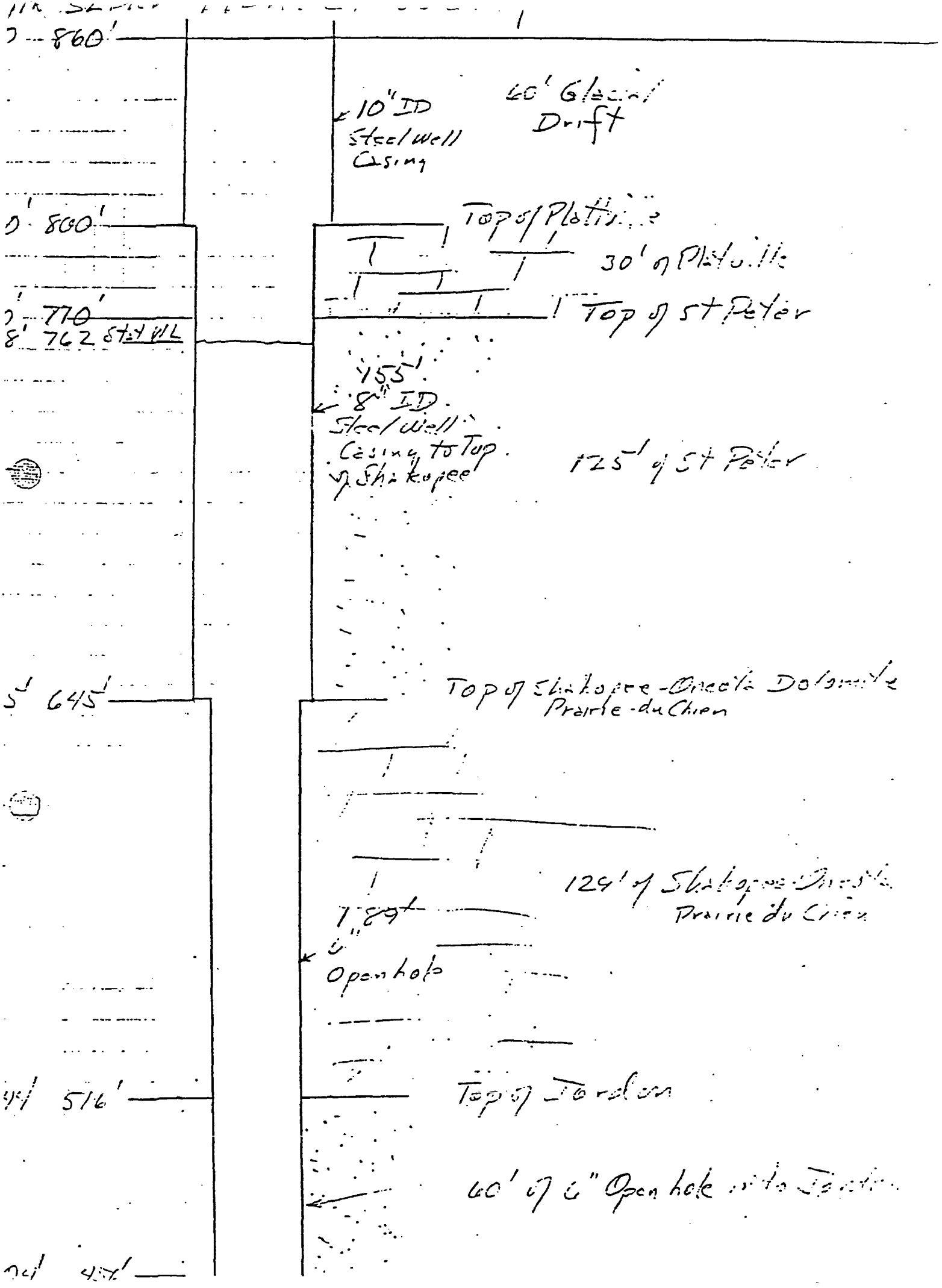
BARR ENGINEERING CO.
Minneapolis, Minnesota

Project: General Mills Solvent Disposal Site
Well No.: 203
Date Started: 12/19/84
Date Completed: 2/6/85
Riser Pipe Elevation: 850.05
Field Inspector: R. Manser (BEC)
Crew Chief: B. Ledbetter (EHR)
Ground Surface Elevation: 847.4

BOREHOLE CONSTRUCTION NOTES	LITHOLOGY	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
Cable tool method 14" diameter casing driven 0'-48' (847.4-799.4)[1]	Sand and Gravel	847.4	14" diameter casing 0'-48' (847.4-799.4) 8" diameter casing 0'-78' (847.4-769.4)
14" diameter open hole advanced 48'-78' (799.4-769.4) 8" diameter open hole advanced 78'-93' (769.4-754.4)	47' (800.4) Limestone (Platteville) 77'[2] 80' Sandstone (St. Peter)	799.4 769.4 754.4	4" diameter casing 0'-96' (847.4-751.4) 20' long, 4" diameter stainless steel well screen 96'-116' (751.4-731.4)
Bail down screen 93'-116' (754.4-731.4)	116' (EOB 731.4)	751.4 749.4 731.4	
			Inner annuli filled with neat cement grout: 0'-78' (14" BH) 0'-85' (8" BH) Sand pack from 85'-93' (762.4-754.4) Protective locking cap
Initial groundwater level 98' (749.4)			

Comments: [1]Elevation ft., MSL
[2]Glenwood shale, 77'-80' (770.4-767.4)

Sheet 1 of 1


860'
10" ID Steel well Casing
60' Glacial Drift
800'
Top of Platteville
30' of Platteville
770'
762 Est WL
Top of St Peter
155'
8" ID Steel well Casing to Top of Shakopee
125' of St Peter
645'
Top of Shakopee-Oneota Dolomite Prairie-du Chien
129' of Shakopee-Oneota Prairie du Chien
7.8 gpm
6" Open hole
516'
Top of Tunnel
60' of 6" Open hole into Tunnel

Barr Engineering Company | **Ref. Boring # Well 14** | **Well # Well 14**

Project: General Mills Well 14 Installation

Project Number:	23/27-169-TMF	**Total Drilled Depth:**	66.0
Boring Location:	NW corner of East Hennepin Site parking lot.	**Ground Surface Elevation (ft):**	856.0
Drilling Contractor:	T.L. Stevens	**Depth to Groundwater (ft):**	35.0
Drilling Method:	Wash rotary with 9.5-inch and 6-inch tricone bits	**Riser Elevation:**	858.53
Driller:	J. Stevens	**Date Started:**	9/15/98
Geologist:	H. Garcia	**Date Completed:**	9/21/98
		Unique #:	616615

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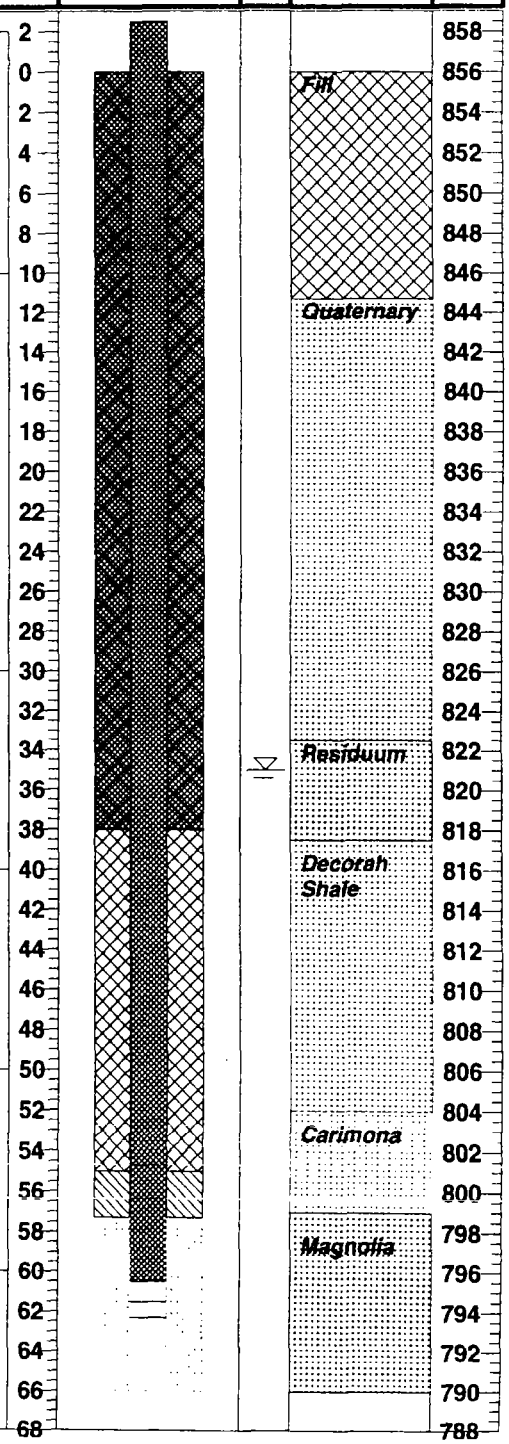
Material Descriptions and Remarks
STEEL CASING: Three coupled, 21.2-foot lengths of 2-inch i.d., black, threaded steel casing (ASTM A-53-F GR-A). Inner steel casing set from 2.49' above grade to 60.5' below grade. The inner steel casing and well screen were set within the outer casing and lower advanced borehole.
STEEL CASING: Three pieces of coupled, 21.1-foot lengths of 6-inch i.d., 0.280-inch thick, black, threaded steel casing (ASTM A533/ASME SA53BE). Outer steel casing set from 2.75' above grade to 38.0' below grade. The outer 6-inch casing was set into place in competentbedrock then grouted with neat cement grout triemed into the annular space between the casing and 10-inch borehole until grout rose within the casing. A 6-inch drill bit was then used to drill through the casing and grouted bottom and into the bedrock below to complete the well installation.
BENTONITE CHIPS: One half bag of hydrated Cetco Pure Gold medium bentonite chips. Bentonite installed from 57.25' below grade to 55.0' below grade to prevent neat cement grout from infiltrating sandpack.
SAND PACK: Two bags of 45-55 sieve Red Flint brand sandpack. Sand pack installed from 57.5' below grade to 66.0' below grade.
NEAT CEMENT: Eighteen total, 94lbs. bags of Lehigh type 1A air-entraining portland neat cement grout. Eleven bags were used to seal the 6-inch outer casing in place and 7 bags were used to seal 2-inch well and casing. Neat cement grout was installed form 55' below grade to flush with grade.
Stainless Steel Screen: One 5-foot length of 10-slot, Stainless steel well screen (Johnson Screen 29632C). Well screen set from 60.5' below grade to 65.5' below grade.



Barr Engineering Company

Well 14

Project: General Mills Well 14 Installation

Project Number:	23/27-169-TMF	**Total Drilled Depth:**	66.0
Boring Location:	NW corner of East Hennepin Site parking lot.	**Ground Surface Elevation (ft):**	856.0
Drilling Contractor:	T.L. Stevens	**Depth to Groundwater (ft):**	35.0
Drilling Method:	Wash rotary with 9.5-inch and 6-inch tricone bits	**Date Started:**	9/15/98
Driller:	J. Stevens	**Date Completed:**	9/21/98
Geologist:	H. Garcia		

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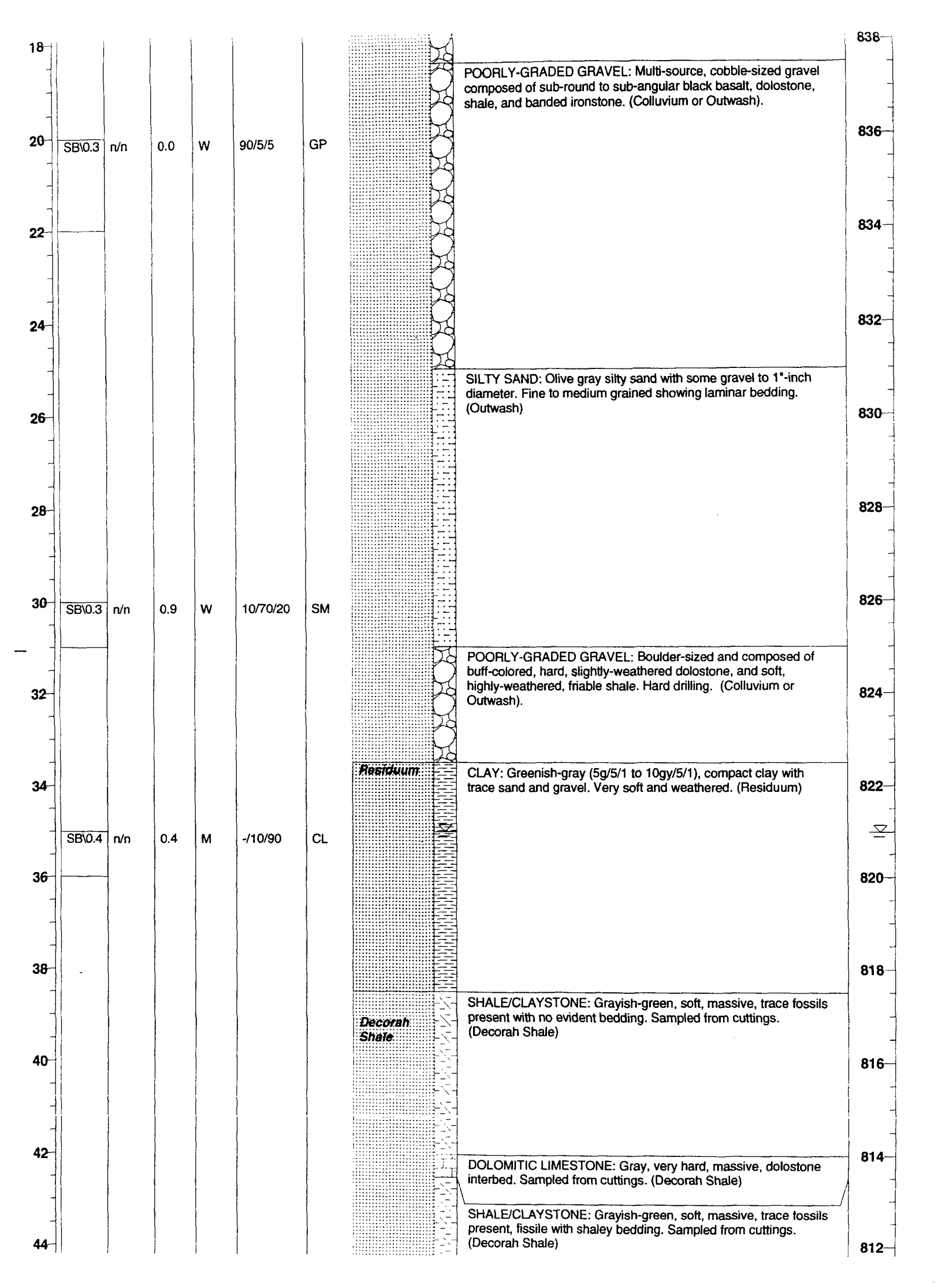
Depth (ft. bgs)	Sample Type\ Recovery (ft)	Odor\Sheen	Headspace (ppm)	Moisture/W.L.	Estimated % of Gravel\Sand\Fine	ASTM	Lithologic Unit	Material Descriptions and Remarks	Elevation
0	SB\1.0	n/n	1.0	M	8/30/62	MH	Fill	FILL: Very dark brown to black sandy silt. Broken glass, organic clay, roots and asphalt. (Fill)	856
2								FILL: Black, soft, organic clayey fill. Peat or lake sediment source. Numerous small (2mm) cephalopods. (Fill)	854
4									852
6									850
8								FILL: White, very soft, chalk with sand. Massive with no laminations or bedding detectable. (Fill?)	848
10	SB\1.5	n/n	1.4	M	-/15/85	MH			846
					1/91/8	SP-SM	Quaternary	CLAY: Gray, compact clay. Thin, mottled unit, possibly till derived residual soil layer. Continuous contact and weathering profile between chalk unit above and sand unit below. (Topsoil).	
12									844
								POORLY-GRADED SAND: Light olive gray, fine to medium-grained sand with trace gravel and silt showing laminar bedding. (Alluvial Outwash)	
14									842
								POORLY-GRADED GRAVEL: Gravel is boulder-sized and composed of buff-colored, hard, slightly-weathered dolostone. and soft, highly-weathered, friable shale. (Colluvium or Outwash).	
16									840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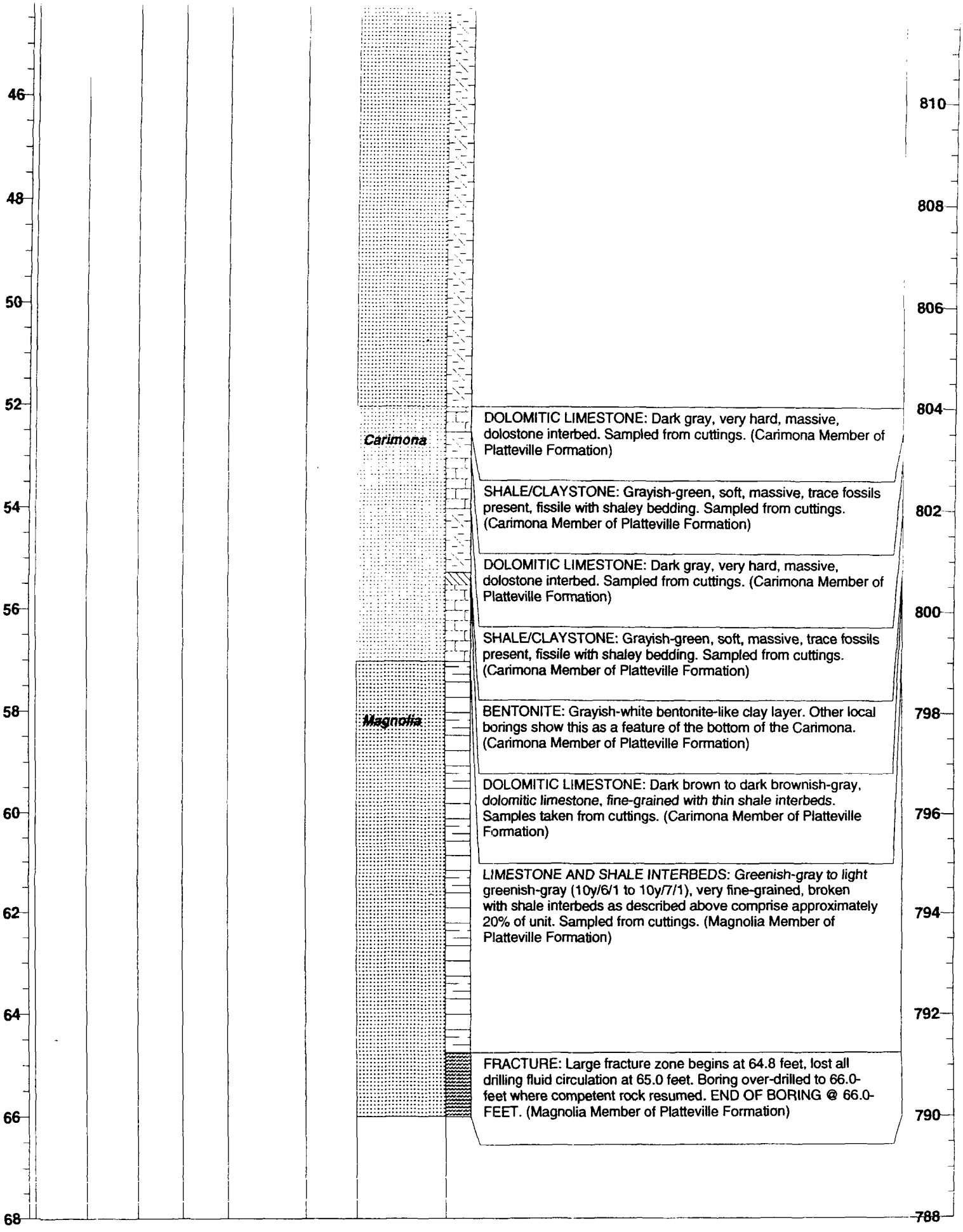
42
44
SB\0.3 n/n 0.0 W 90/5/5 GP
SB\0.3 n/n 0.9 W 10/70/20 SM
SB\0.4 n/n 0.4 M -/10/90 CL
Residuum
Decorah Shale
838
836
834
832
830
828
826
824
822
820
818
816
814
812
POORLY-GRADED GRAVEL: Multi-source, cobble-sized gravel composed of sub-round to sub-angular black basalt, dolostone, shale, and banded ironstone. (Colluvium or Outwash).
SILTY SAND: Olive gray silty sand with some gravel to 1"-inch diameter. Fine to medium grained showing laminar bedding. (Outwash)
POORLY-GRADED GRAVEL: Boulder-sized and composed of buff-colored, hard, slightly-weathered dolostone, and soft, highly-weathered, friable shale. Hard drilling. (Colluvium or Outwash).
CLAY: Greenish-gray (5g/5/1 to 10gy/5/1), compact clay with trace sand and gravel. Very soft and weathered. (Residuum)
SHALE/CLAYSTONE: Grayish-green, soft, massive, trace fossils present with no evident bedding. Sampled from cuttings. (Decorah Shale)
DOLOMITIC LIMESTONE: Gray, very hard, massive, dolostone interbed. Sampled from cuttings. (Decorah Shale)
SHALE/CLAYSTONE: Grayish-green, soft, massive, trace fossils present, fissile with shaley bedding. Sampled from cuttings. (Decorah Shale)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810
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802
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796
794
792
790
788
Carimona
Magnolia
DOLOMITIC LIMESTONE: Dark gray, very hard, massive, dolostone interbed. Sampled from cuttings. (Carimona Member of Platteville Formation)
SHALE/CLAYSTONE: Grayish-green, soft, massive, trace fossils present, fissile with shaley bedding. Sampled from cuttings. (Carimona Member of Platteville Formation)
DOLOMITIC LIMESTONE: Dark gray, very hard, massive, dolostone interbed. Sampled from cuttings. (Carimona Member of Platteville Formation)
SHALE/CLAYSTONE: Grayish-green, soft, massive, trace fossils present, fissile with shaley bedding. Sampled from cuttings. (Carimona Member of Platteville Formation)
BENTONITE: Grayish-white bentonite-like clay layer. Other local borings show this as a feature of the bottom of the Carimona. (Carimona Member of Platteville Formation)
DOLOMITIC LIMESTONE: Dark brown to dark brownish-gray, dolomitic limestone, fine-grained with thin shale interbeds. Samples taken from cuttings. (Carimona Member of Platteville Formation)
LIMESTONE AND SHALE INTERBEDS: Greenish-gray to light greenish-gray (10y/6/1 to 10y/7/1), very fine-grained, broken with shale interbeds as described above comprise approximately 20% of unit. Sampled from cuttings. (Magnolia Member of Platteville Formation)
FRACTURE: Large fracture zone begins at 64.8 feet, lost all drilling fluid circulation at 65.0 feet. Boring over-drilled to 66.0-feet where competent rock resumed. END OF BORING @ 66.0-FEET. (Magnolia Member of Platteville Formation)